AUTOMATED
HEMATOLOGY
CELL COUNTER

Service Manual

SERVICE MANUAL

Rx Only

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December 2003

Issued on: *March 01, 1998*
Last revision on: *December 04, 2003*

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1: GENERAL CONSIDERATIONS

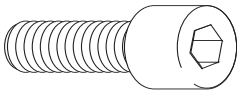
GENERAL CONSIDERATIONS

This Service Manual explains how to perform all the operations for the MS4® maintenance.

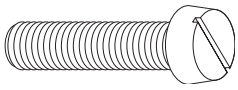
It describes step by step each phase for dismantling the main parts of the instrument by illustrations and numbered reference marks. Execute the operations in the increasing order given by the marks (from 1 to n).
To assemble the parts afterward, execute the operations in the reverse order of dismantling.

IMPORTANT: When removing the screws, take care to mount back the correct screw into the right place. Mixing size or type of screws can cause the malfunction of the instrument.

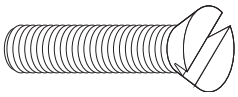
A description of the screws used in the MS4® is shown below.



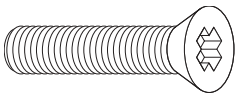
Hexagon socket head Screw



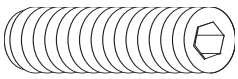
Slotted Pan Head Screw



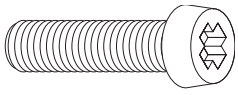
Slotted Countersunk Head Screw



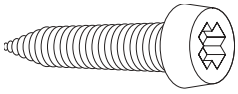
Pozidriv™ Countersunk Head Screw



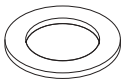
Hexagon socket set Screw



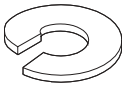
Pozidriv™ Pan Head Screw



Pozidriv™ Self-Tapping Pan Head Screw

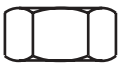


Plain Washer



Spring Lockwasher

Star Lockwasher



Hexagon Nut

All information given in this manual is subject to change, due to the upgrade of functionality, without notice from MELET SCHLOESING Laboratoires

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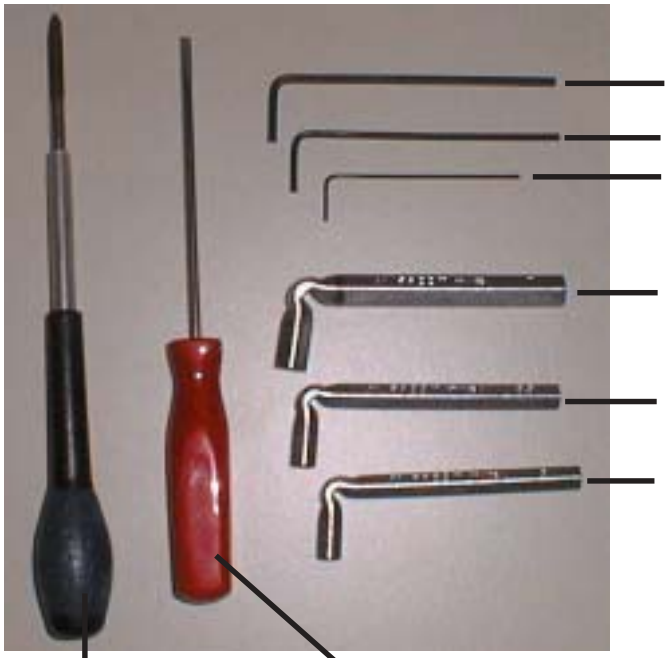
1.1 REQUIRED TOOLS

The set of tools shown below allows taking appart and reassembling all the device parts.



Under the figures in the next pages, the tool required to dismantle a part is shown as an icon as illustrated above.

2: ELECTRONIC PARTS

ELECTRONIC PARTS

Advice

The first part of this manual shows how to dismantle the electronic parts with the intention of replacing one of them.

If an exchange is necessary, replace the entirety of the block as given in the MS-LAB reference list to benefit from the warranty if required. Do not return the defective part separately.
For example, the mother board block includes the electronic mother board mounted on the metallic underframe. The latter one protects the pressure sensor during transportation so it is important not to dismantle this part.

Exceptionally, a single defective spare part must be returned to the MS Laboratoires after-sales service, only with the prior approval of a MS Laboratoires service engineer.

To dismantle the parts correctly, execute the operations in the order described in this manual.

2.1 AMPLIFIER BOARD

Notes:

Figure 2.1.1: Take the front cover off:
Remove the 4 Pozidriv™ Countersunk Head Screws with a Pozidriv™ screwdriver.

Figure 2.1.2: Unplug electrical connectors:
① Amplifier flat cable.
② Probe connector.
③ Photometer receptor connector.
④ Photometer emitter connector.

Figure 2.1.3: Dismantle Amplifier board:
- Remove the 4 hex spacers with a 5 pipe key.
- Pull out the 4 Spring lock washers.

Figure 2.1.4: Take the amplifier board out.

IMPORTANT:
All settings are factory made.
- Never change the gain setting.
The gain setting must be changed only under technical software and Pulse Cell Generator.
- Offset setting can be controlled under technical software.
- Probe setting must be adjusted under technical software control after the board replacement.

MS-LAB reference:
Amplifier Board : 3MS04 241

Figure 2.1.1

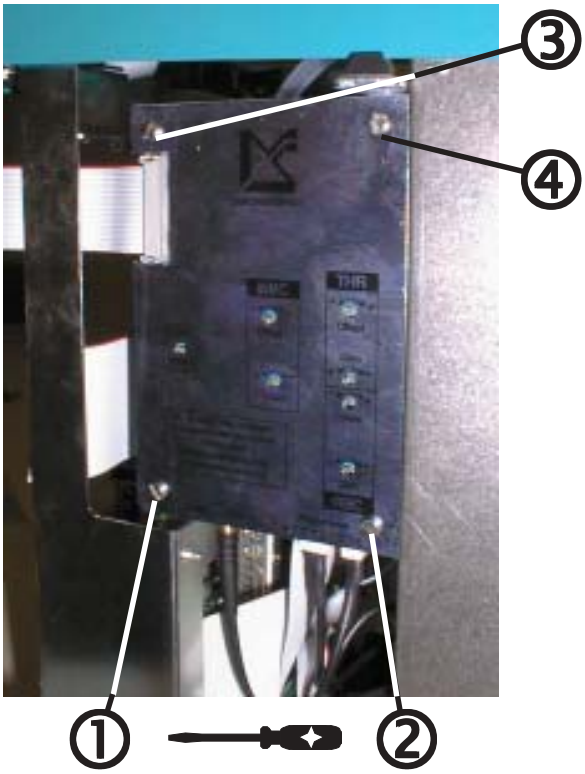


Figure 2.1.2

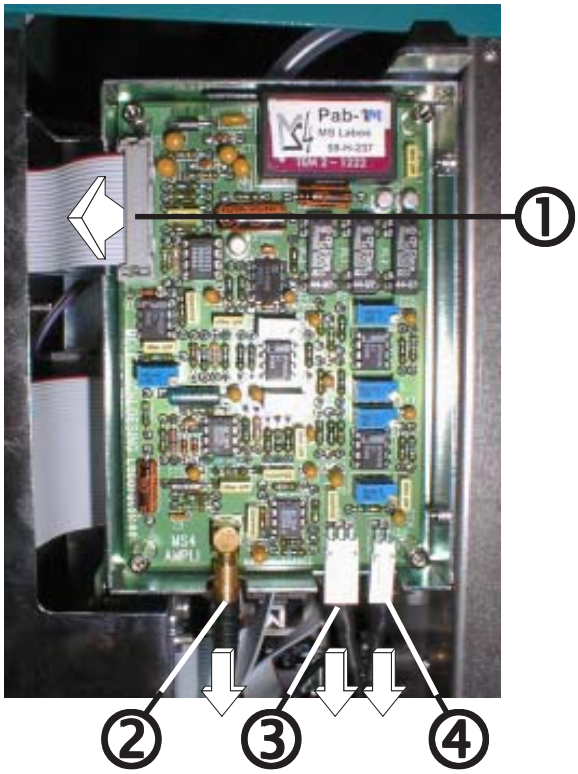


Figure 2.1.3

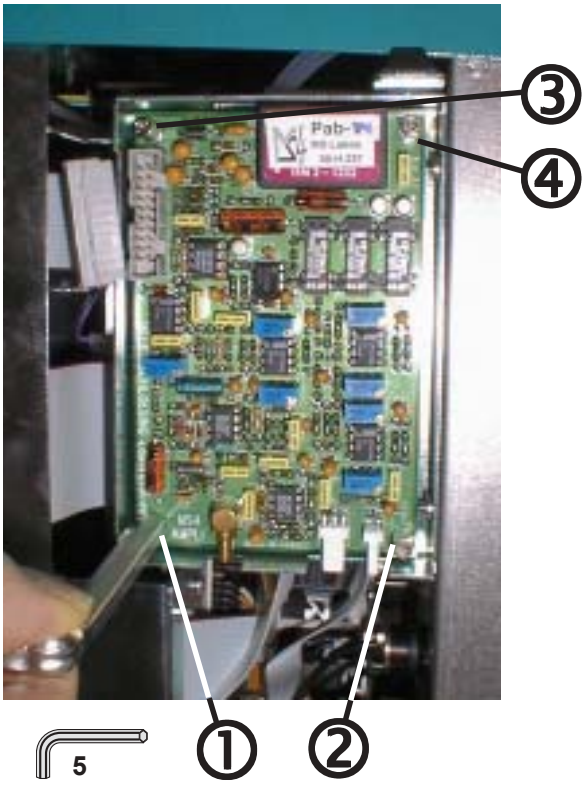


Figure 2.1.4

2.2 INTERNAL PARTS ACCESS

Notes:

To access electronic or mechanical internal parts, it is necessary to remove the external covers.

Figure 2.2.1: Right side cover:
- ① With the device closed, remove the Pozidriv™ Countersunk head screw underneath the instrument.
- Open the device top cover.
- ② ③ Remove the two Pozidriv™ Countersunk Head screws on the side.

Figure 2.2.1: Backside cover beginning:
- ④ ⑤ Remove the two Pozidriv™ Countersunk Head screws on the side.
- Close the device top cover.

Figure 2.2.2: Backside cover ending :
- ⑥ ⑦ ⑧ Remove the three Pozidriv™ Pan Head screws.
- Pull out the bottom of the backside cover and take it off.

Figure 2.2.1

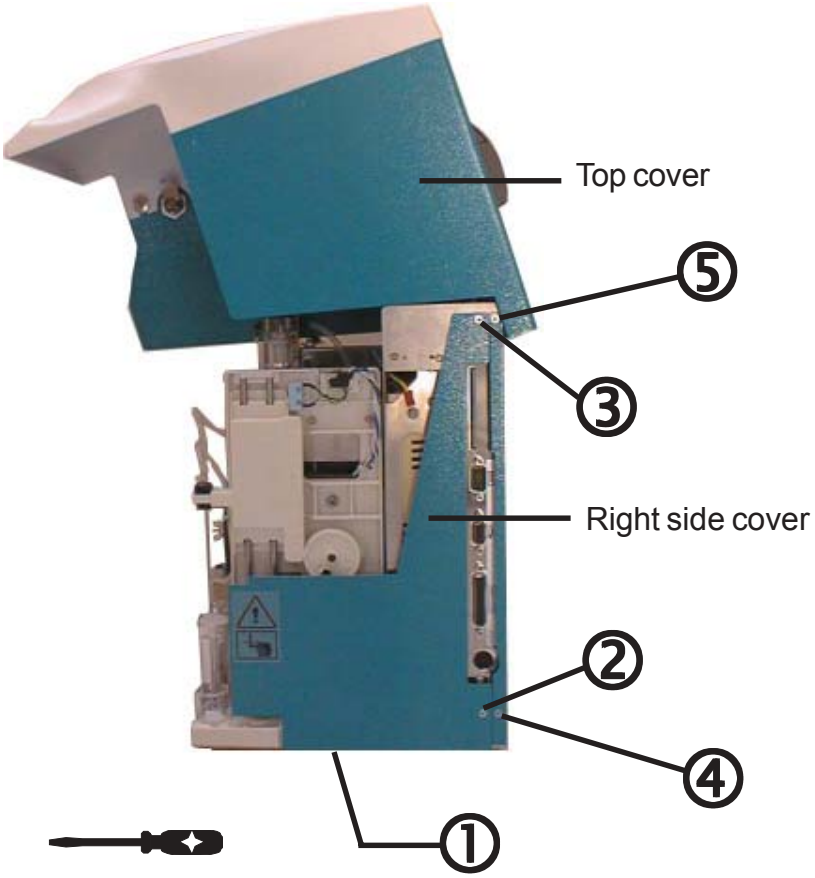
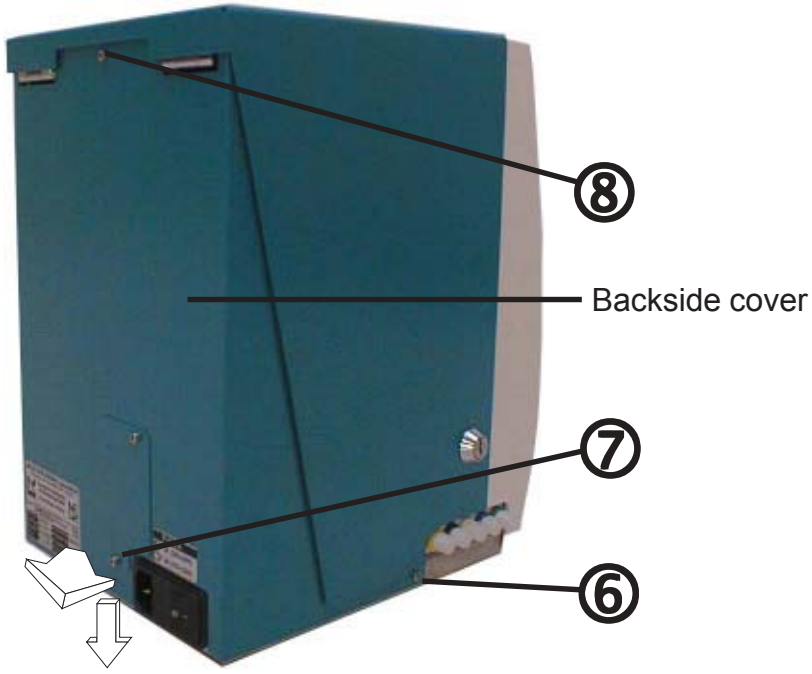


Figure 2.2.2



2.3 MOTHER BOARD (1)

Notes:

With the top cover open

Figure 2.3.1: Unplug electrical connectors:
- ① to ⑤ Unlock flat cable connectors as shown by arrows and pull out cables.
- ⑥ Pull out the power connector.

Figure 2.3.2: Unplug earth wire:
- Remove the Nut and the Star Lockwasher and pull out the earth wire.

Figure 2.3.3: Unlock the axis:
- On inside of the top cover, unscrew the Hexagon socket head cap screw until it is nearly out of the hole of the mother board block.

Figure 2.3.4: Detail of the mother board block axis.

MS-LAB reference:
Mother Board block: 3MS04 942

Figure 2.3.1

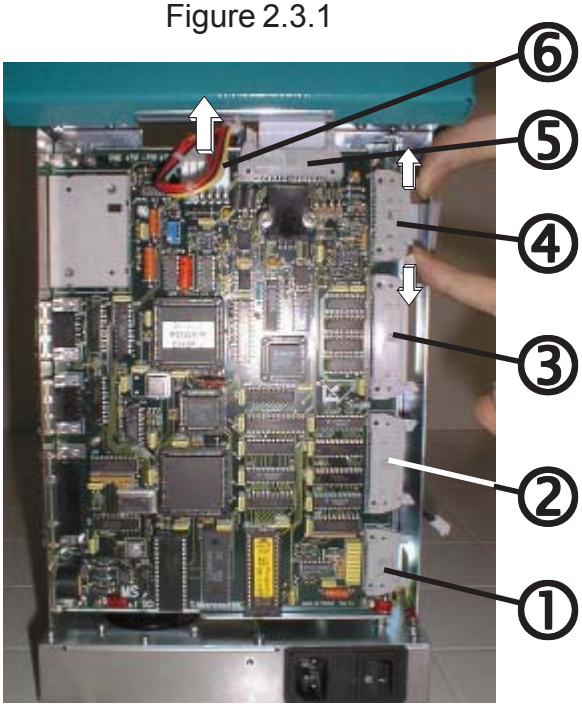


Figure 2.3.2

5.5

Figure 2.3.3

2.5

Figure 2.3.4

MOTHER BOARD (2)

Notes:

Figure 2.3.5: Unlock the mother board block:
- Close the top cover.
- Remove the Hexagon socket head cap screw located at the upper left of the block.

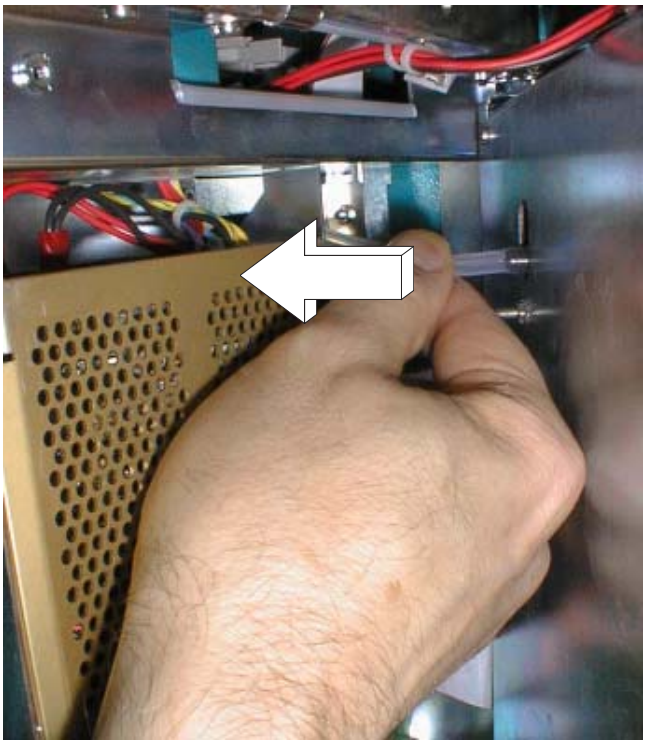
Figure 2.3.6: Unplug the pressure sensor tube:
- Swivel the metallic block to access the air pressure tube and pull it out of the pressure sensor.

Take out the whole block by lifting it up and pulling it towards the rear.

Figure 2.3.5

2.5

Figure 2.3.6



2.4 FAN REPLACEMENT

Notes:

The replacement of the fan is easier when the mother board is removed.

Figure 2.4.1: Unlock the Air flow guide:
- ① Unplug the electrical connector of the fan.
- Pull the head of the two Plastic Snap Rivets to release them. A flat blade screwdriver will make it easier to release.

Figure 2.4.2: Pull out the Air flow guide:

Figure 2.4.3: Unlock the fan:
- Underneath the instrument, pull the head of the four Plastic Snap Rivets to release them. A flat blade screwdriver will make it easier to release.
The fan is ready to be removed.

Note: to use the Plastic Snap Rivets again, put first the body in place on the hole then place the head in place and press it to lock.

MS-LAB reference:
Fan for MS4: 3MS04 652

Figure 2.4.1

Figure 2.4.2

Figure 2.4.3

2.5 POWER SUPPLY (1)

Notes:

In order to take the switching power supply out, the mother board block must be removed first.

Figures 2.5.1 - 2.5.2: Take off the front cover:
- Remove the 4 Countersunk head cross screws located at each side of the power supply.
- Pull out the front cover.

Notice: On some power supplies, the font cover can be held in place by a simple Slotted countersunk head screw which can be removed with a flat screwdriver.

MS-LAB reference:
Power supply for MS4: 3MS04 233

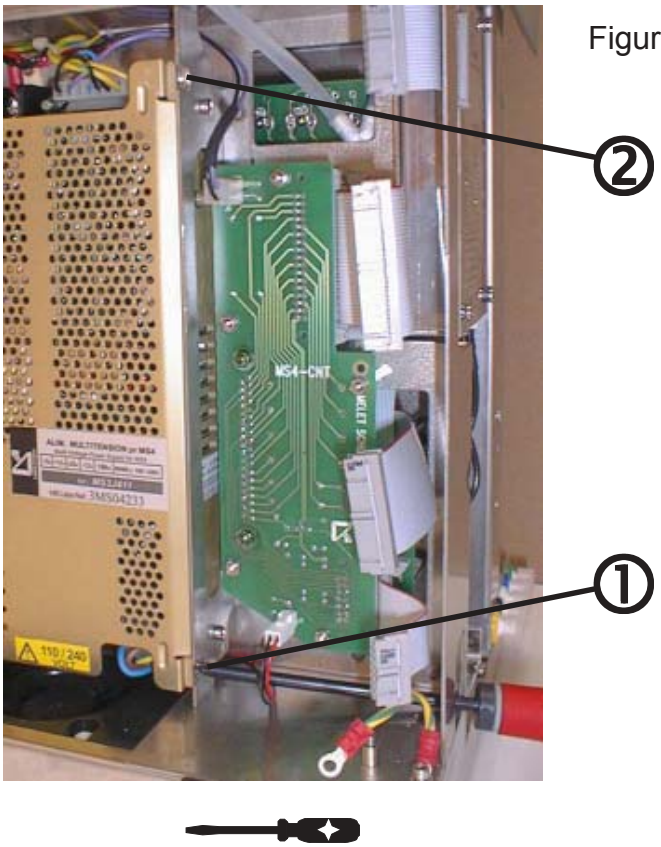


Figure 2.5.1

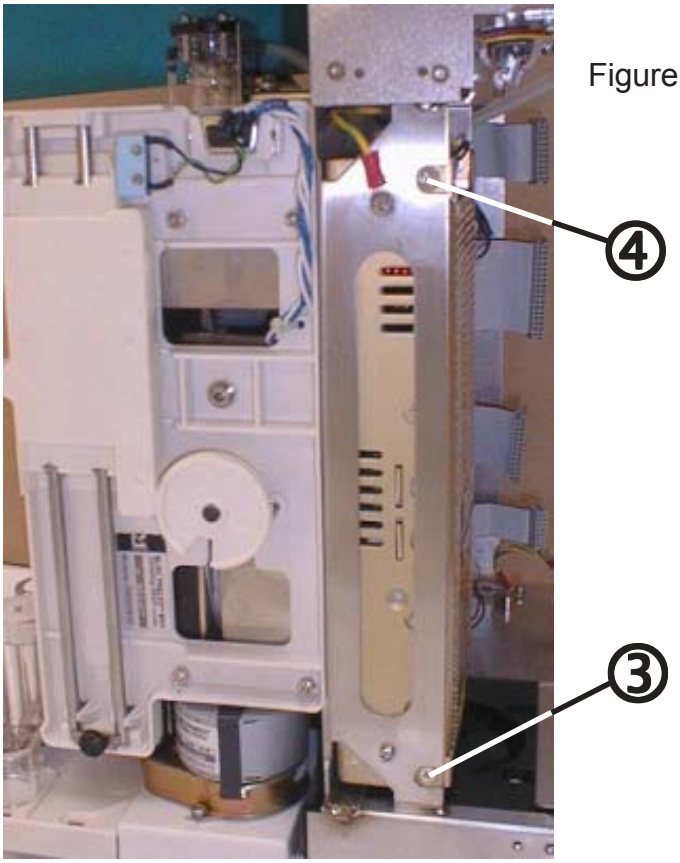


Figure 2.5.2

POWER SUPPLY (2)

Notes:

Figure 2.5.3: Unplug the power out connector:
- This connector is a little bit difficult to disconnect. A flat blade screwdriver will make it easier to unplug.

Figure 2.5.4: Unplug the power out wires:
Remove the two screws with a Pozidriv™ screwdriver and pull out the nuts to disconnect the wires.
Remember that the Red cable is connected on the left and the Black cable, to the right.

Figure 2.5.5: Unplug the power in connector:
- A flat blade screwdriver will make it easier to unplug.

Figure 2.5.3

Figure 2.5.4

Figure 2.5.5

POWER SUPPLY (3)

Notes:

Figures 2.5.6- 2.5.7: Pull the power supply out:
- Remove the 4 Pozidriv™ Pan Head screws located at each side of the power supply.
- Take note of the location of the earth wire on the upper screw in the figure 2.5.7.

Figure 2.5.8: Extract the power supply from the machine.

IMPORTANT:
When returning the switching power supply in the factory for replacement, make sure that it is sent back with all its accessories (i.e. wire nuts screwed and front cover screwed).
If any screws or parts are missing, the warranty becomes null and void.

Figure 2.5.6

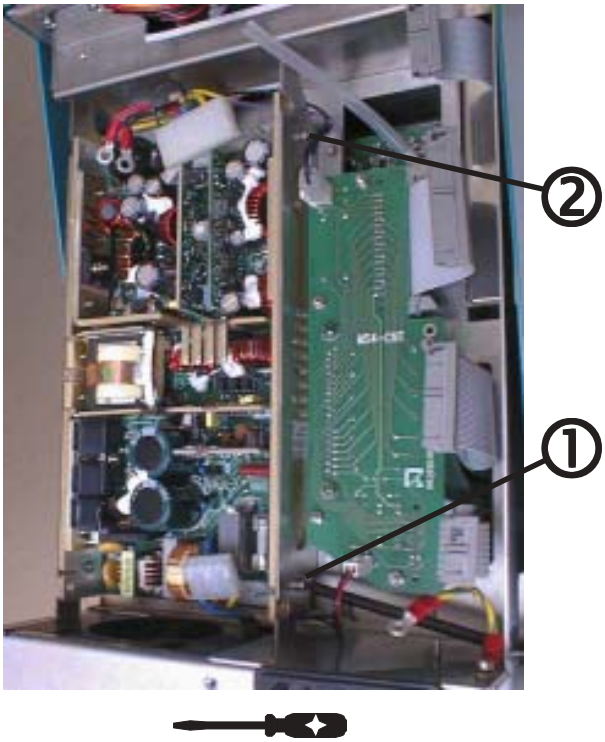


Figure 2.5.7

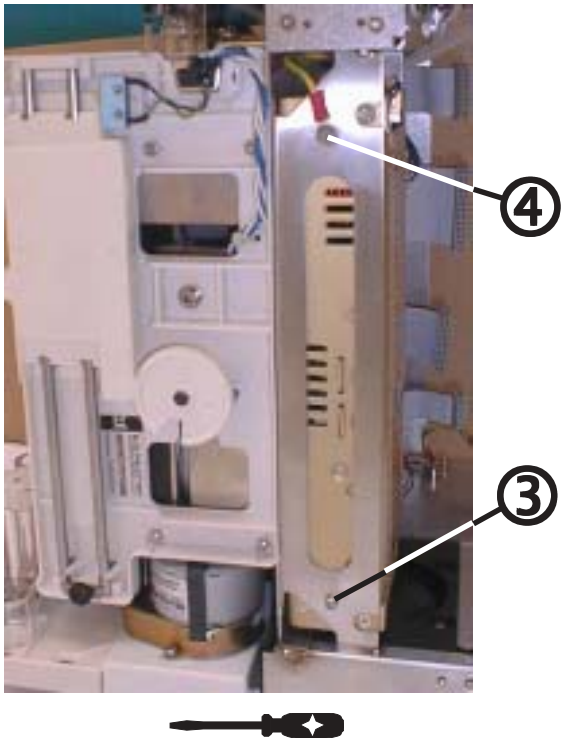


Figure 2.5.8

2.6 DISPLAY BOARD

Notes:

Figure 2.6.1: Pull the display board cover out:
- ① Unlock and unplug the flat cable connector from the printer block .
- ② to ⑤ Remove the 4 Pozidriv™ Countersunk Head Screws located at each corner of the cover.
- Take note of the location of the earth wire on the bottom right hand screw.
- While supporting the block on the external side of the instrument plastic cover, take the display block cover off.

Figure 2.6.2: Take the display board off:
Pull the whole display block outside of the plastic cover.

MS-LAB reference:
Front Cover + Display: 3MS04 964
Display Board + Keyboard block: 3MS04 945

Figure 2.6.1

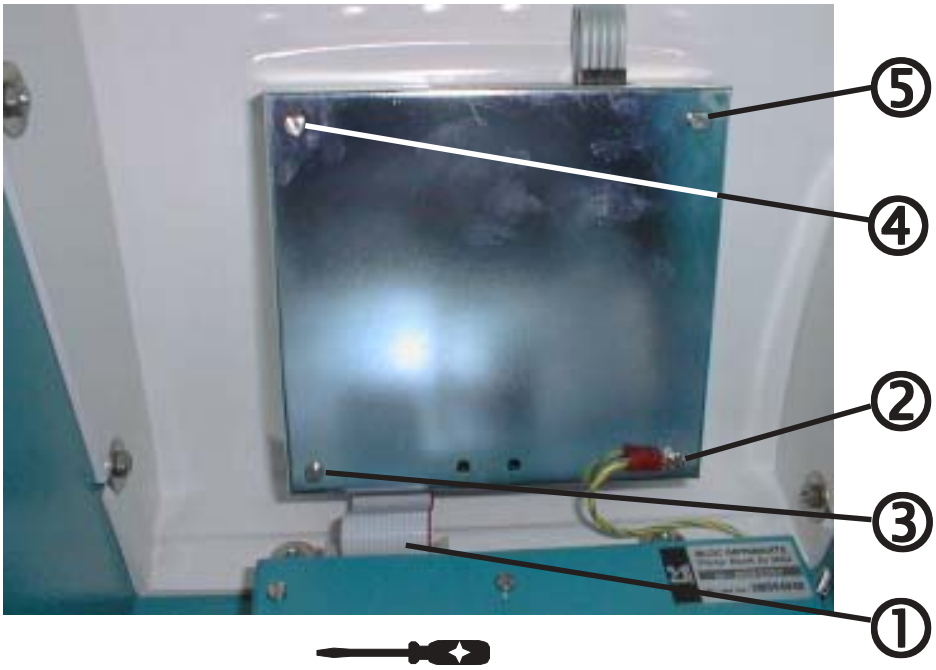


Figure 3.6.2

2.7 PRINTER BLOCK

Notes:

Figure 2.7.1: Pull out the cover:
With the instrument top cover closed, open the printer cover.
Press strongly each side of the plastic base and pull the cover up to remove it.

Figure 2.7.2: Pull out the printer block:
Inside the instrument top cover opened
- ① ② Unplug the 2 flat cable connectors after unlocking them.
- ③ to ⑥ Remove the 4 hex spacers with a 5 mm pipe key. Be careful to maintain the hex pipe in an upright position when unscrewing it.
- Take note of the location of the 2 earth wires at the ④ and ⑤ spacers
- Take the entire printer block off.

IMPORTANT:
When returning the printer block to the factory for replacement, make sure that it is sent back in totality (i.e. metallic support, electronic board and thermal printer still connected).
If any parts are missing, the warranty becomes null and void.

MS-LAB reference:
Printer Block for MS4: 3MS04 941

Figure 2.7.1

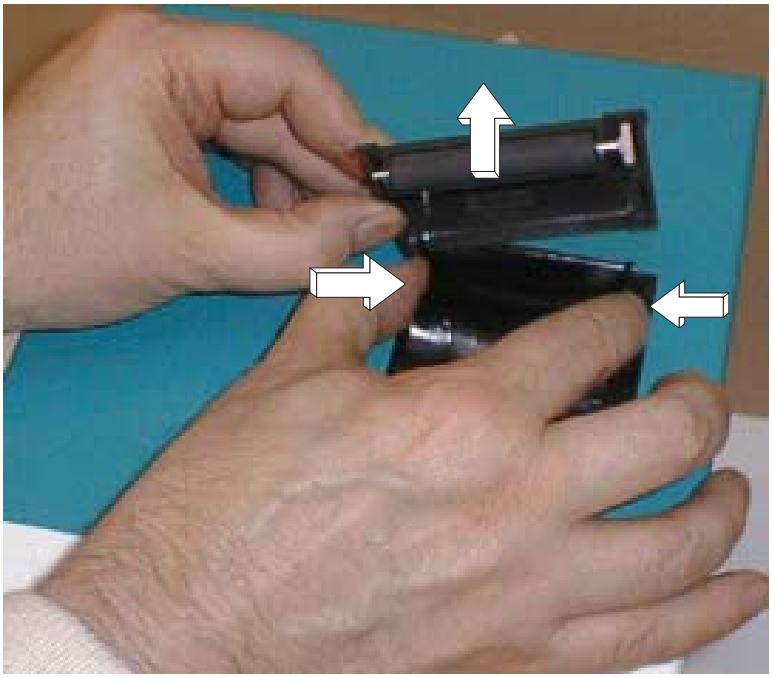
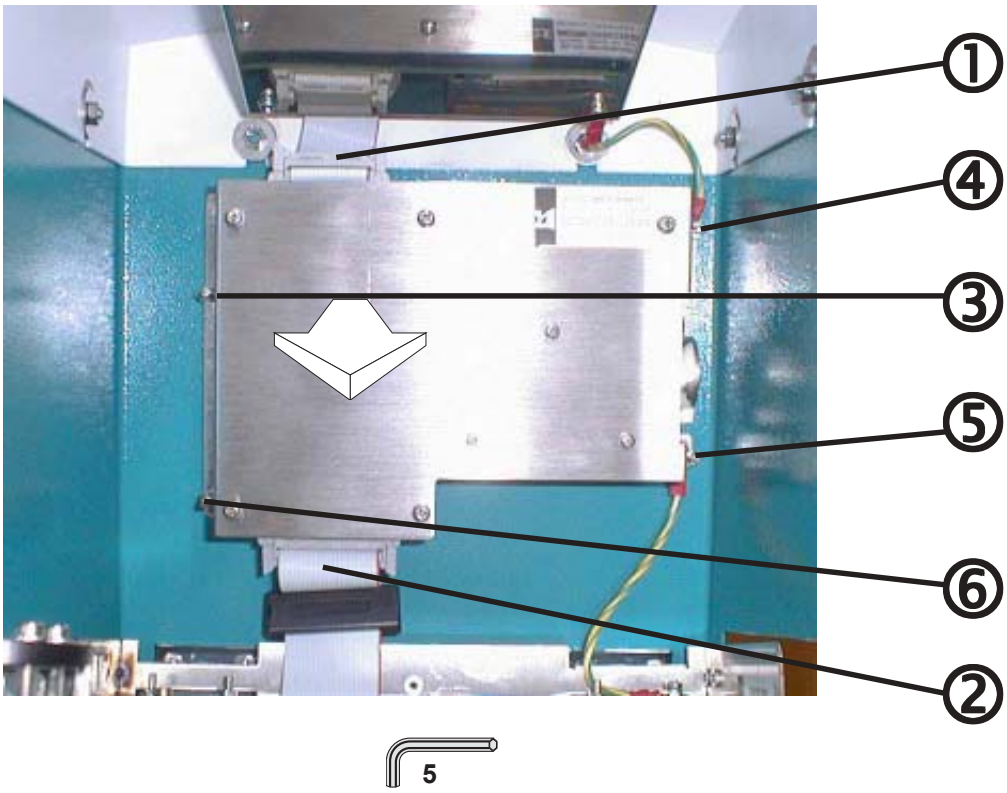


Figure 2.7.2



2.8 FUSES REPLACEMENT

Notes:

Figure 2.8.1: Unlock the plastic cover.

Figure 2.8.2: Pull out the plastic drawer to extract fuses.

Figure 2.8.3: Take the fuses out, check and replace them if necessary.

Warning:
These fuses do not blow without reason. Either the power supply itself has a problem or another electronic part malfunction cause this anomaly.
Verify that the fuse rating current is of the correct value according to the voltage used in your country (refer to the identifying sheet in the back cover of the machine).

Figure 2.8.1

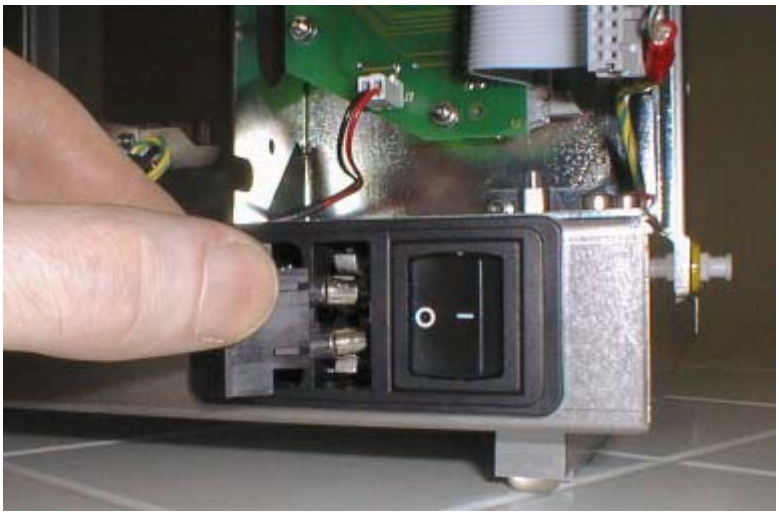


Figure 2.8.2

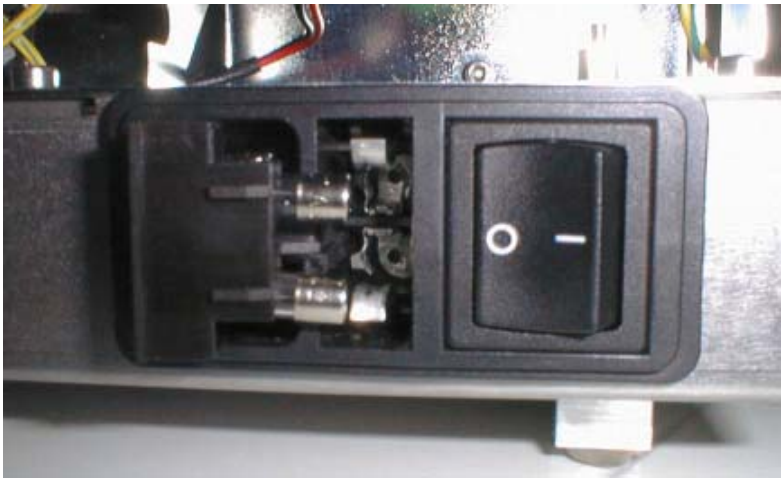
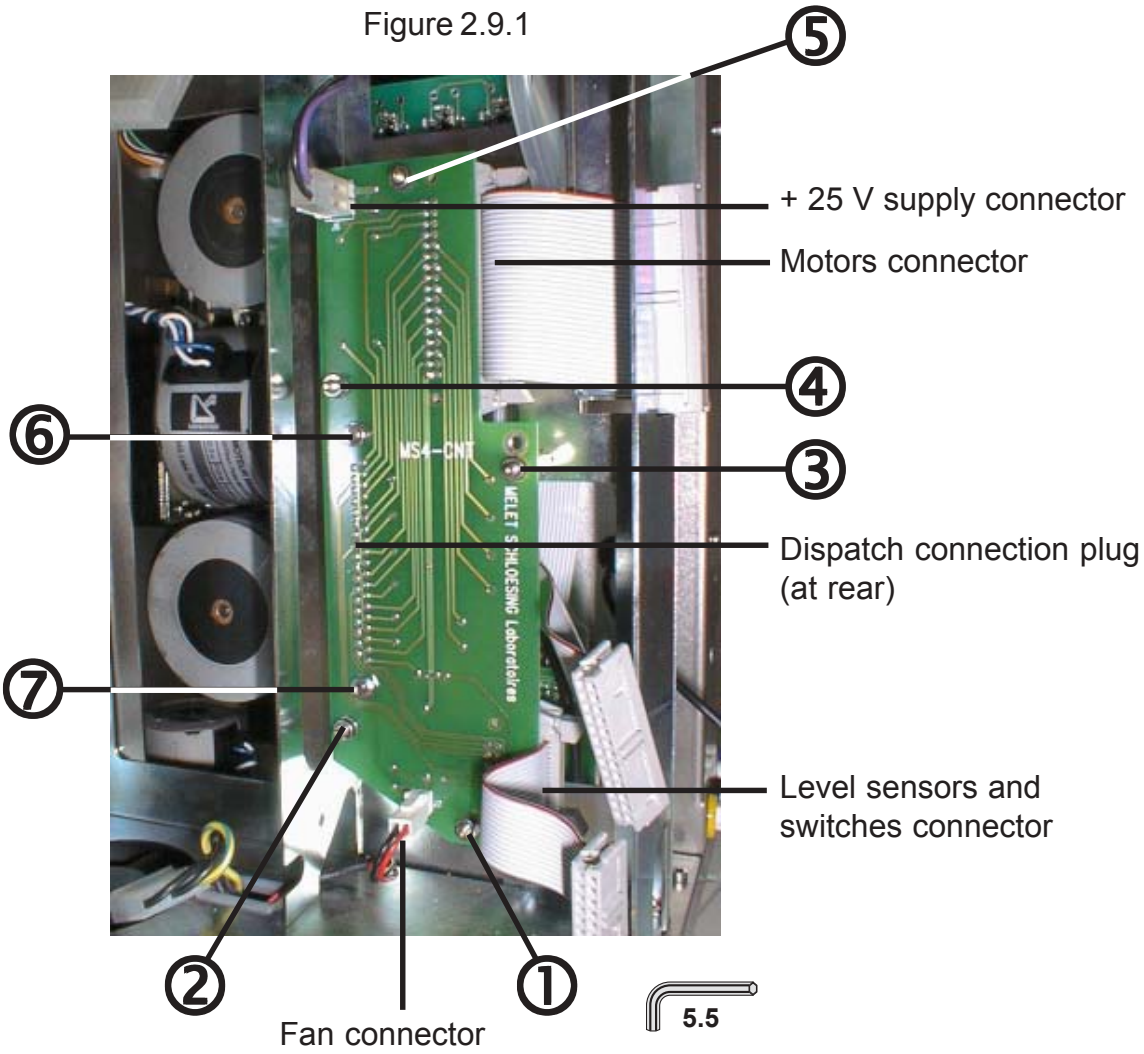


Figure 2.8.3

2.9 CONNECTORS BOARD

Figure 2.9.1



- ① to ⑤ Shows the nuts to remove in order to take the board apart although this is not necessary.
- The figure above shows the location and the function of the connectors.
- ⑥ and ⑦ Shows the nuts to remove in order to unplug the motors connector at the back side of the connectors board

MS-LAB reference:
Connection board: 3MS04 215

3: FLUIDIC PARTS

3.1 ABOUT FLUIDIC PARTS

Notes:

Unlike electronic parts, some fluidic (and mechanical) parts need maintenance servicing from time to time.

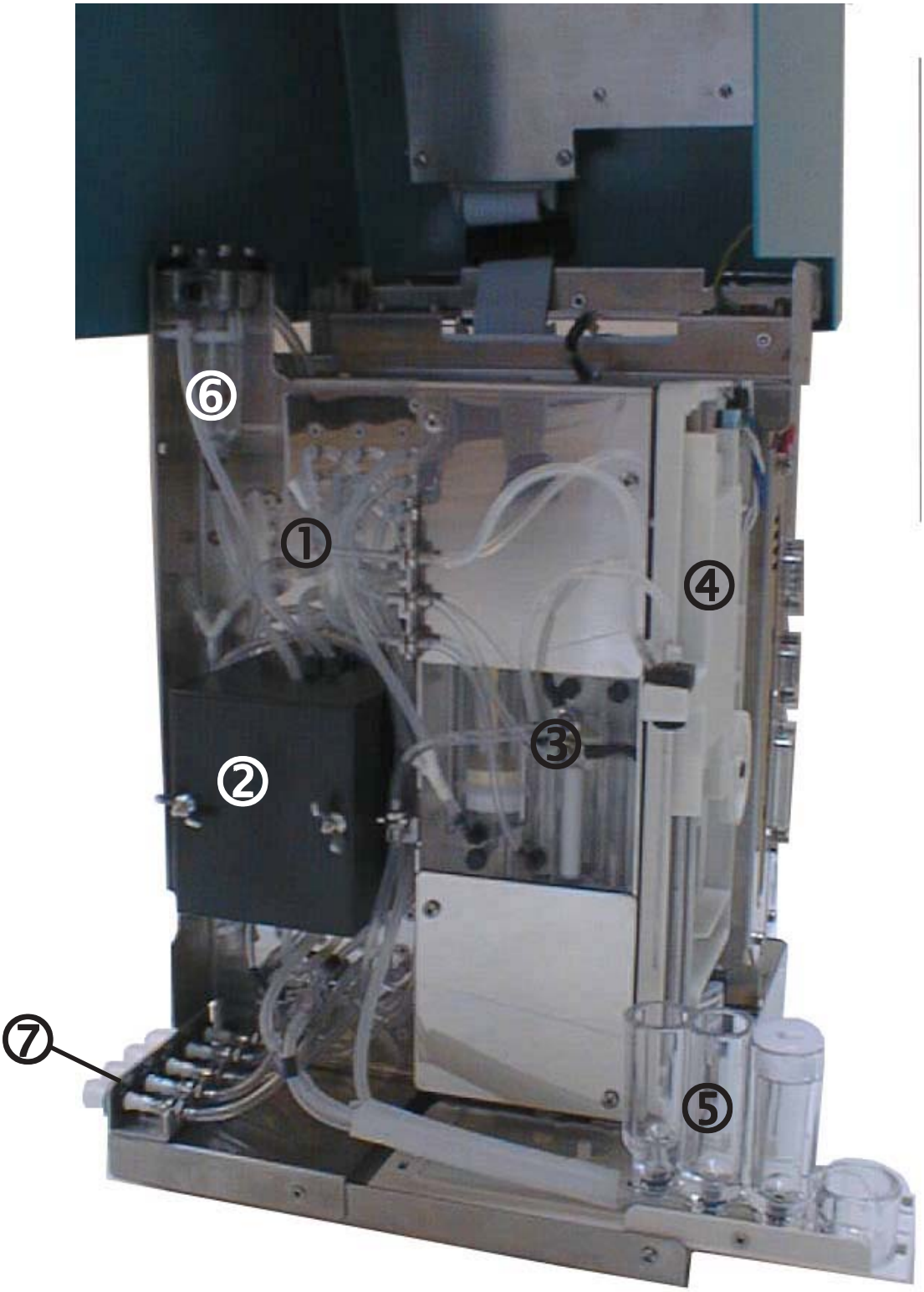
If after dismantling the parts, it is difficult to reconnect the fluidic tubes, refer to the schematic drawing in the *Principle Circuit* chapter.

PRESENTATION

To facilitate the comprehension of the following chapters, the photo opposite of the open device shows the location of the main blocks of the machine which are described in detail later.

① The Measuring Block which includes the Valves and the Measuring chamber.
② The Measuring Chamber, protected by a cover, which includes the Photometer.
③ The Syringe Pump Block.
④ The Sampling Block.
⑤ The Carrier Block with the Dilutor.
⑥ The Expansion Chamber.
⑦ The Fluidic connector.

Figure 3.1.1



3.2 SYRINGE PUMP BLOCK

Notes:

Figure 3.2.1: Take mechanism covers off:
- Move the dilutor carrier to the extreme right.
- ① ② Remove the 2 screws on bottom cover and take it off.
- ③ ④ Remove the 2 screws on top cover and take it off.

Figure 3.2.2: Unplug tubes:
- ① to ⑦ Unplug the 7 tubes at the locations shown in the figure.

Figure 3.2.3: Unlock syringe block:
- ① to ③ Remove the 3 hex spacers.

Figure 3.2.4: Take off the syringe block:
- Pull out gently to disconnect the upper and lower connectors and extract the block.

MS-LAB reference:
Syringe Pump for MS4: 3MS04 920
Syringe Pump Motor: 3MS04 409S
Air Pump Motor: 3MS04 409A

Figure 3.2.1

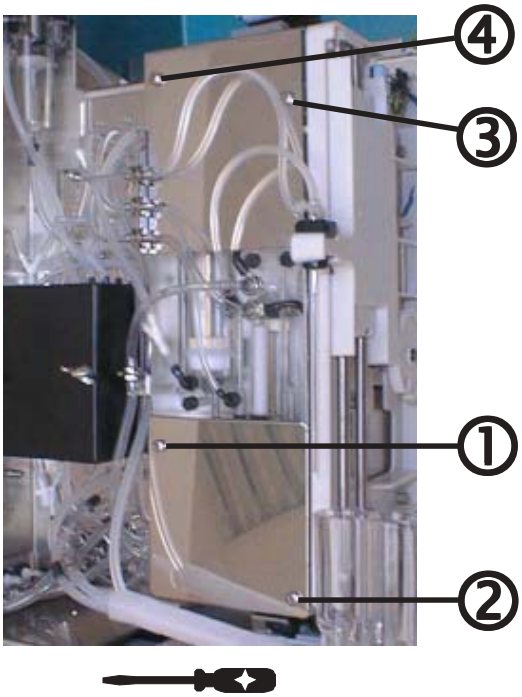
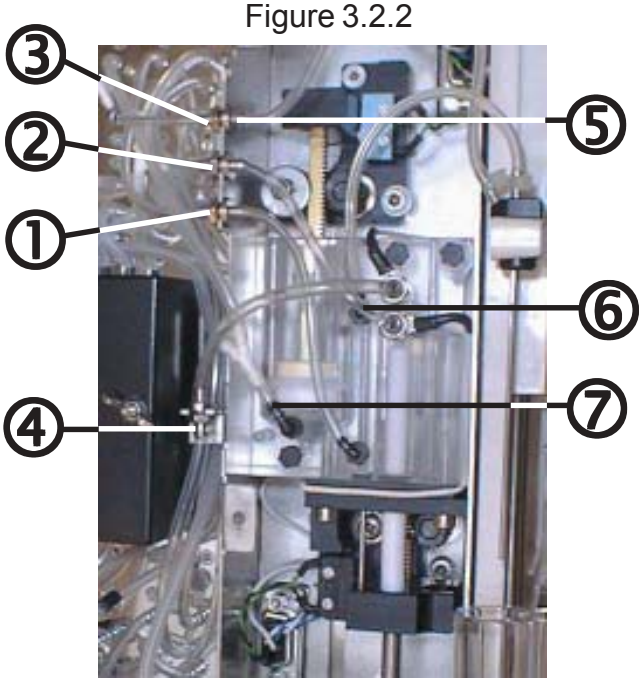


Figure 3.2.2



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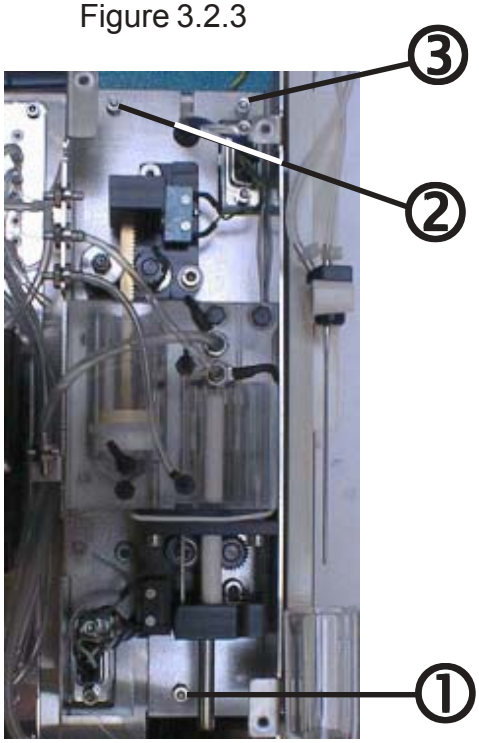


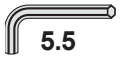
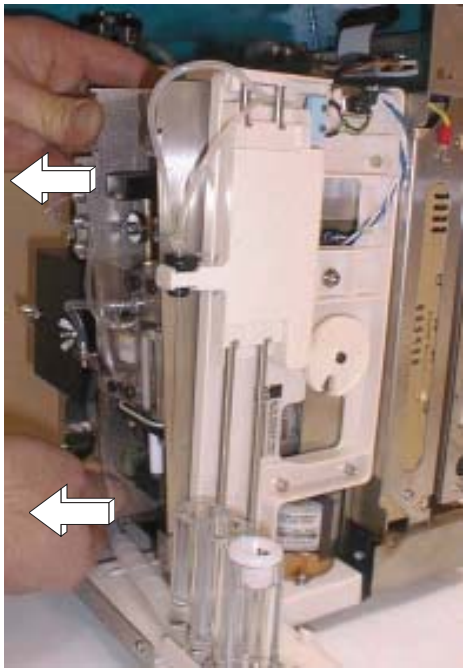


Figure 3.2.4



3.3 SYRINGE PUMP HEAD (1)

Notes:

From time to time (around 10 000 cycles) the syringe pump head must be greased and the O-Ring used to seal off each Piston must be changed.

First dismantle the Pump Head from the Pump Block

Figure 3.3.1: Remove the tubes:
- ① to ③ Pull out the 3 tubes from the fittings.
- ① - ② Remove the 2 nuts (Pipe Key Hex 9) in order to remove the 2 level sensor cable (① Diluent and ② Lyse respectively).

Figure 3.3.2: Unlock the two stepper motors:
- ① - ② With a 3 mm Hexagon Key, give the located screws a counterclockwise half turn then rotate the motors to move the gear wheels away form the rack.

Figure 3.3.3: Take the bottom switch off:
- Remove the two screws with a Flat blade screwdriver.

Figure 3.3.4: Unlock the syringe pump head:
- ① to ③ Remove the 3 Hexagon socket head cap screws and 3 Plain washers.

Figure 3.3.1

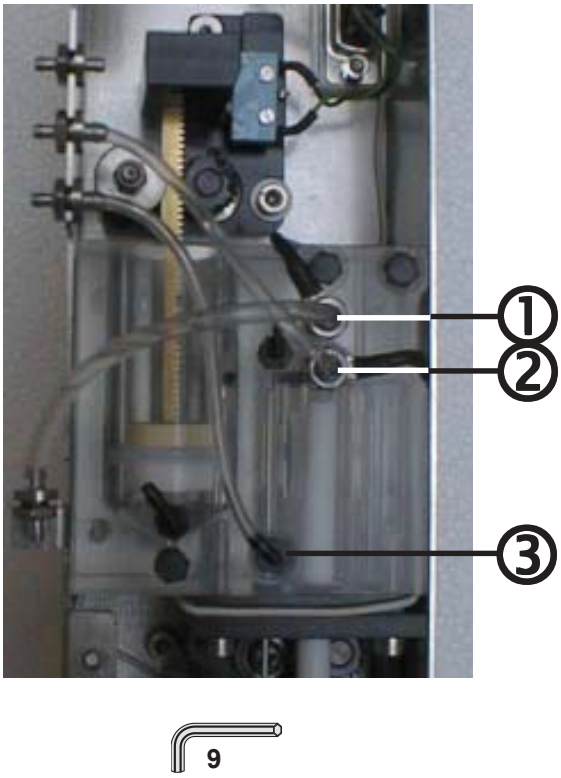


Figure 3.3.2

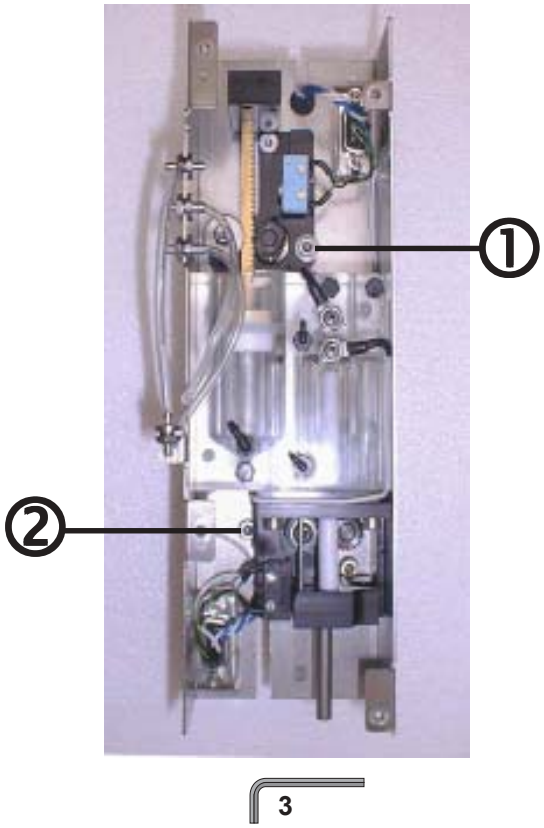


Figure 3.3.3

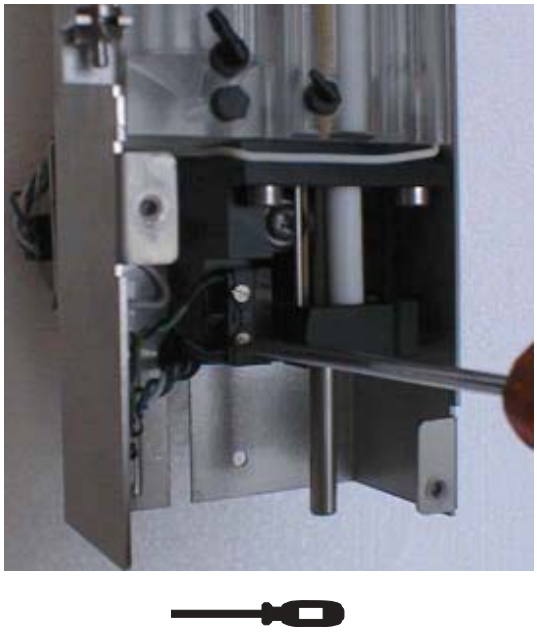
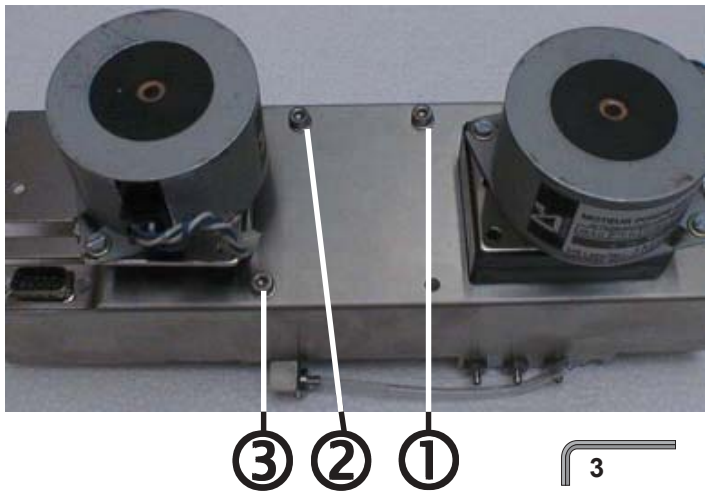


Figure 3.3.4



SYRINGE PUMP HEAD (2)

Notes:

Figure 3.3.5: Take the pump head off:
- Pull out the pump head from the frame.

Figure 3.3.6: Take the locking plate off:
- ① to ④ Remove the 4 Hexagon socket head cap screws.

Figure 3.3.7: Pull out the Pistons:
- ① Remove the entire Syringe piston from the pump head by pulling the bottom black plastic part.
- ② Only if necessary, remove the Air piston by pulling the toothed rack bar on the axis on the piston. Generally, the Air piston Teflon head does not need replacement.

Figure 3.3.5

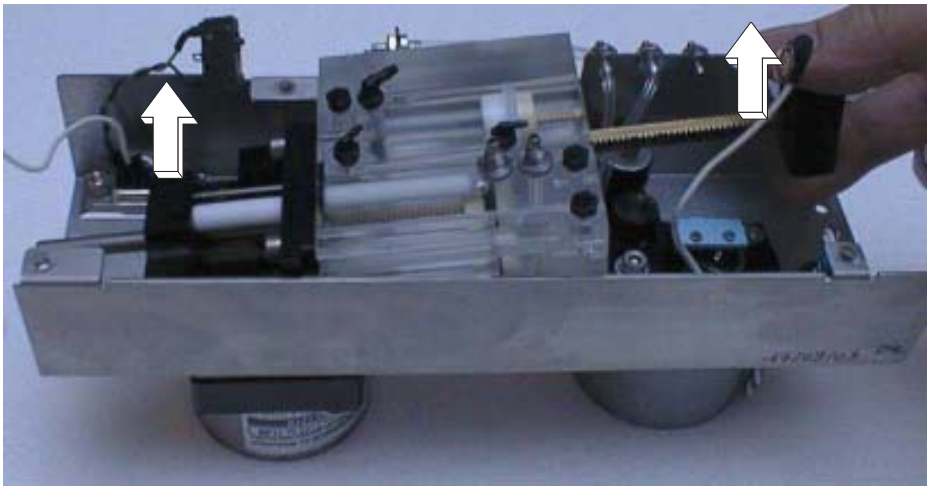
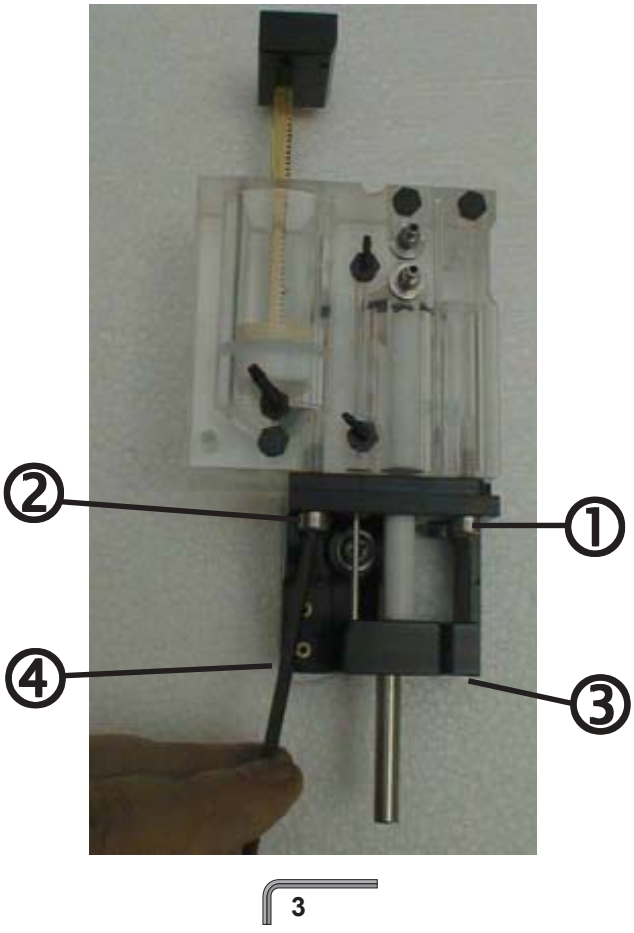
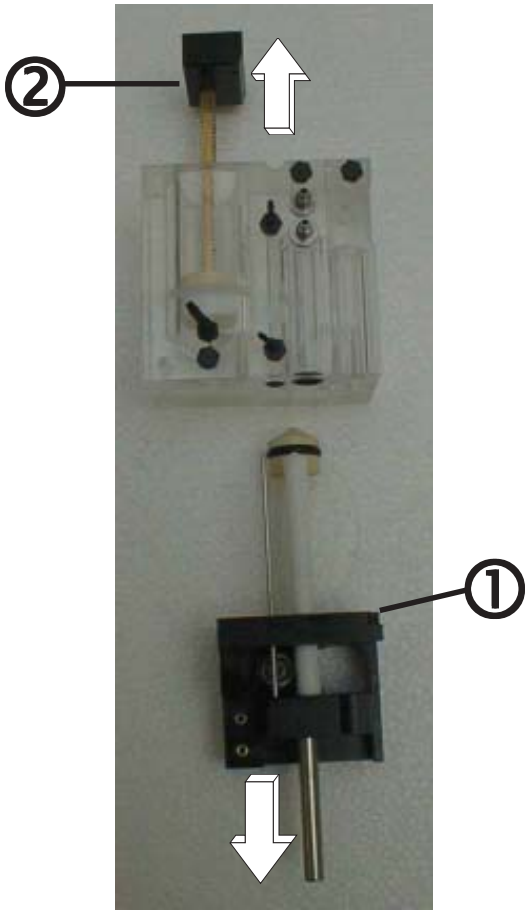


Figure 3.3.6



3

Figure 3.3.7



3.4 SYRINGE PUMP GREASING (1)

Notes:

Figure 3.4.1: Cleaning the Lyse chamber:
- Generally, as shown in the figure, the Lyse piston O-Ring ① comes with syringe piston block and stays on the Lyse piston (the white Teflon piston). If it has staying in the Lyse chamber, it must be removed for replacement.
- Clean the Lyse chamber with a cotton bud stick.
- Never grease the internal Lyse chamber or the sampling chamber (the smaller chamber).

Figure 3.4.2: Cleaning the Diluent Chamber:
- Clean the chamber with a very lint free DRY cloth.

Cleaning must be done with a DRY piece of cloth.
NEVER USE ANY SOLVENT OR DETERGENT.

Figure 3.4.3: Grease the Diluent chamber:
- Use the fingers to grease the different parts of the pump head. Be careful, to do this with clean fingers to avoid spreading dust or dirty particles.

NOTE:
The Air chamber must NEVER been greased.

MS-LAB reference:
Special grease for Syringe and O-Ring:
3MS09 890

Figure 3.4.1

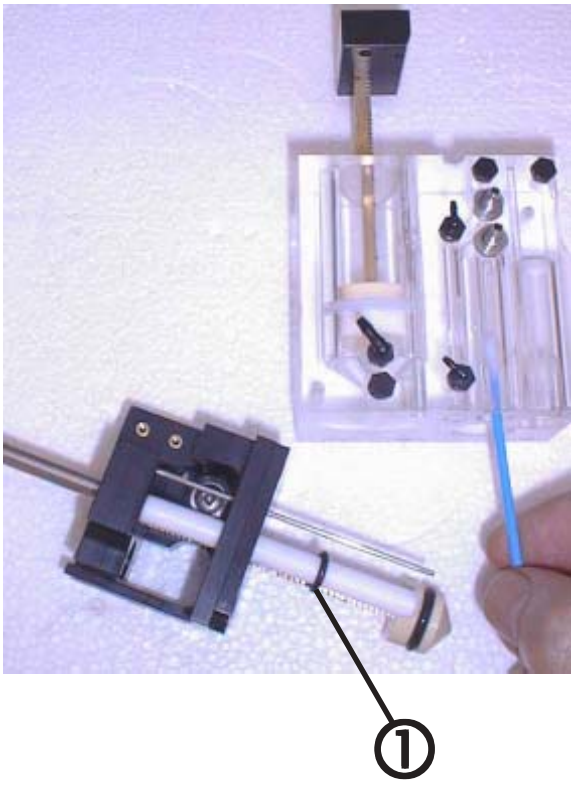
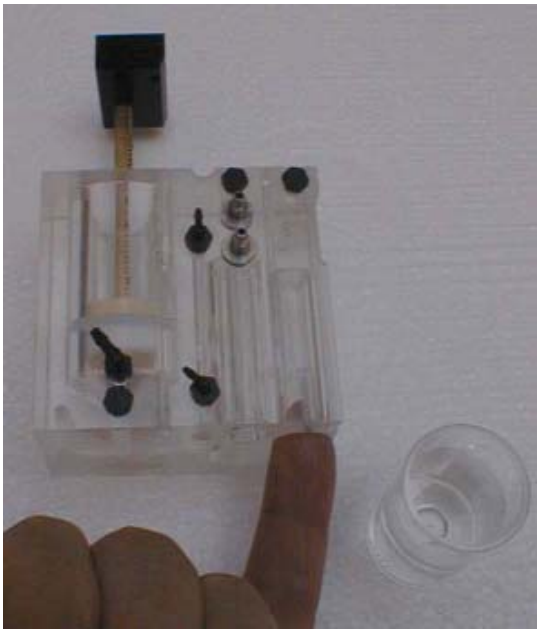


Figure 3.4.2

Figure 3.4.3



SYRINGE PUMP GREASING (2)

Notes:

Figure 3.4.4: Greasing the Lyse piston O-Ring:
- Take the O-Ring of the Lyse piston and grease it with fingers.
- Put the O-Ring back into the bottom of the Lyse chamber.

Figure 3.4.5: Master O-Ring replacement:
- Take the old O-Ring off from the master Diluent piston, grease the new O-Ring with the fingers and put it back.
- Remove the grease in excess with the finger.

Figure 3.4.6: Lyse and Sampling foot chambers:
- ① Blood sampling O-Ring and blood sampling Teflon foot ring location and expanded schematic view for detailed placement of these two parts.
- ② Lyse piston O-Ring placement.

MS-LAB reference:
Syringe set of O-Ring for MS4:
3MS04 905

Figure 3.4.4

Figure 3.4.5

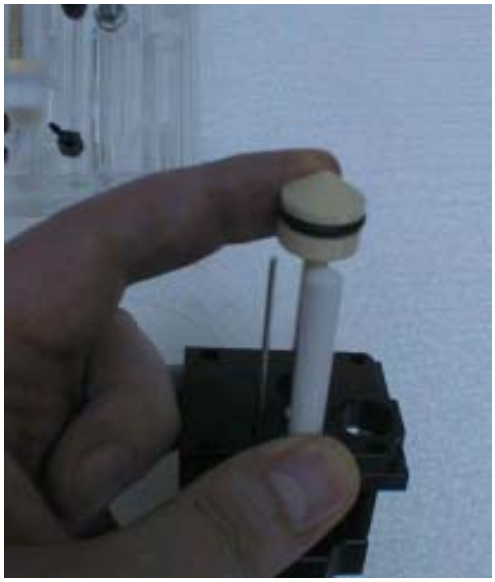
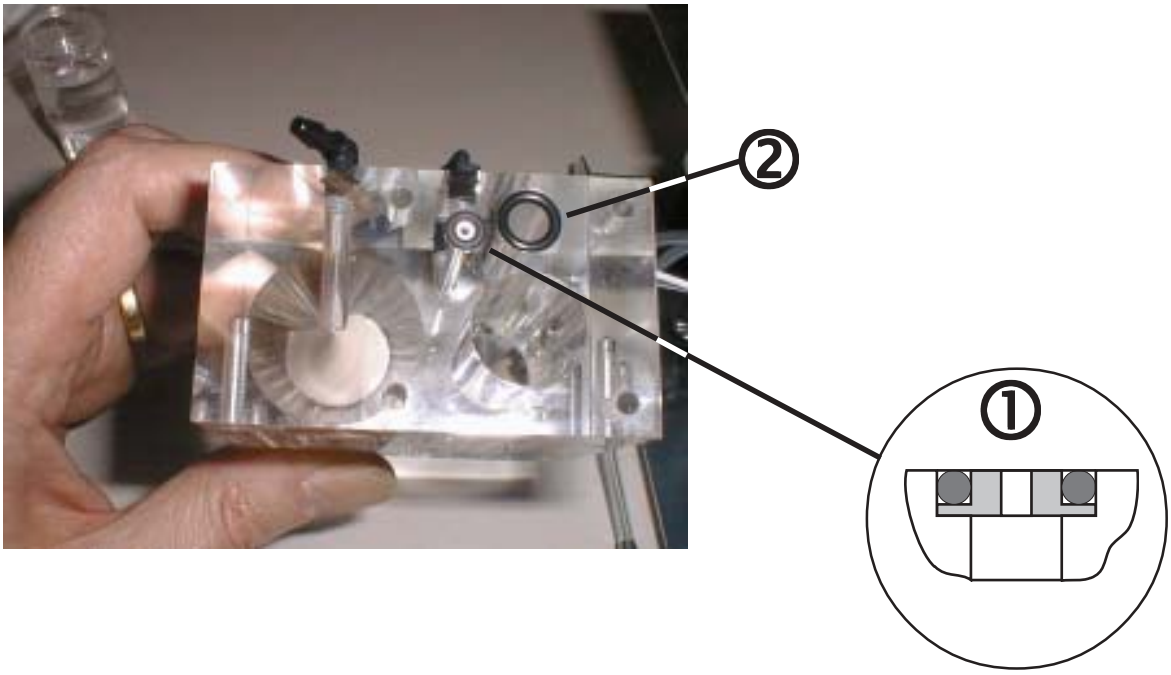


Figure 3.4.6



3.5 SAMPLING BLOCK (1)

Notes:

Figure 3.5.1: Unlock the Sampling Block:
- Remove the 4 hex spacers ① - ④ to unlock the block.

Figure 3.5.2: Take the Sampling Block out:
- If the Syringe Pump Block is already in place, pull out the 2 needle tubes from the pump head fittings .
- Gently, pull the Sampling block out, beginning by the top part in order to unplug the electrical connector.

MS-LAB reference:
Plastic Sampling Block for MS4:
3MS04 930B
Sampling block Motor: 3MS04 490N

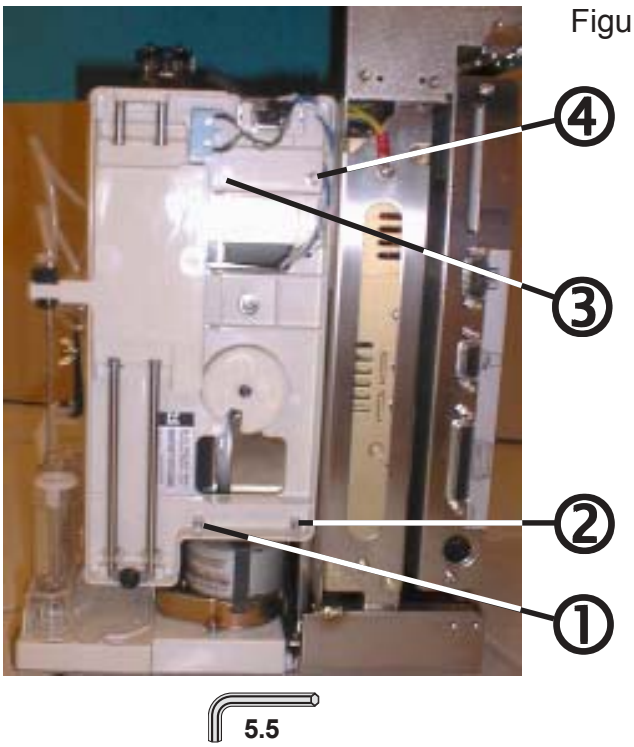


Figure 3.5.1

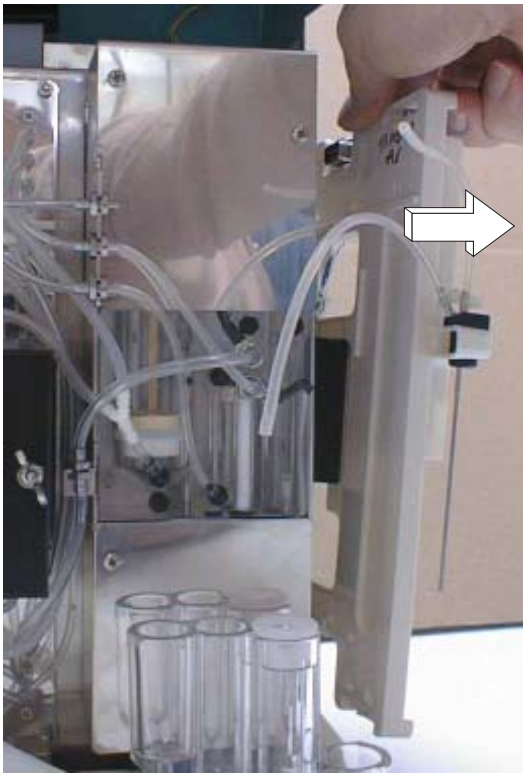


Figure 3.5.2

SAMPLING BLOCK (2)

Notes:

Figure 3.5.3: Exploded view

Presentation of all detailed parts of the Sampling Block.

Figure 3.5.4: Note about mounting of gear wheel:
Take care to leave about 10 teeth of the gear wheel free when the needle carriage is at the upper limit stop.

Figure 3.5.3

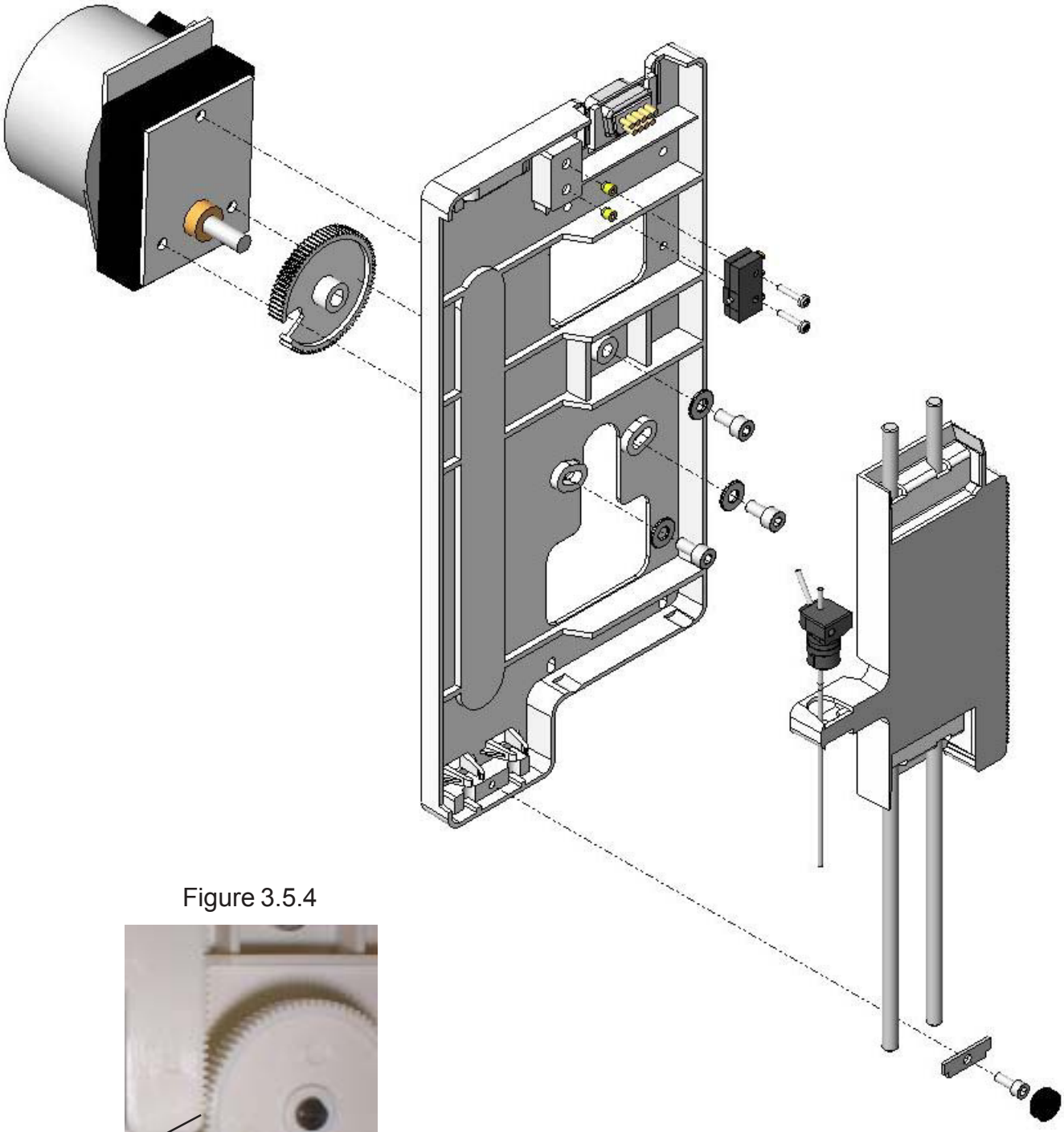
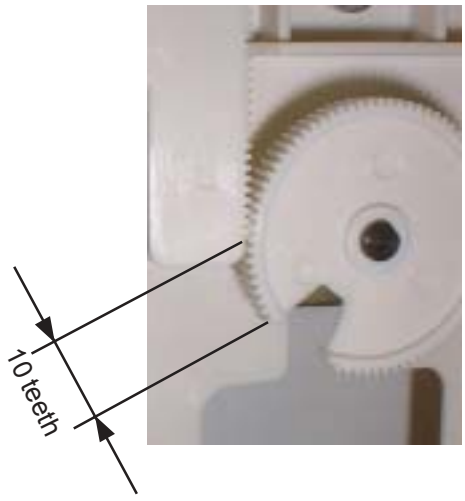


Figure 3.5.4



3.6 NEEDLE REPLACEMENT

Notes:

MS-LAB reference:
Sampling Needle for plastic sampling block: 3MS04 932

A. REMOVING

Figure 3.6.1: The needle is just snapped to the sampling block, but is strongly fixed. Turn it a quarter-turn counterclockwise while pulling it out. It should partially come up.

Figure 3.6.2: Now, turn it half-turn clockwise, taking care not to put it back in place.

Figure 3.6.3: At last, remove it by pulling it out while turning it counterclockwise.

B. REPLACEMENT

Figure 3.6.4: Insert the needle in the hole designed for it. Try to keep the needle as parallel to the sampling block as possible.

Figure 3.6.5: Push the needle while turning it a quarter-turn clockwise. You should feel a first snap, retry as long as you do not feel it.

Figure 3.6.6: Finally, put the needle in place by turning it counterclockwise. It should snap easily into place this time.

Figure 3.6.1

Figure 3.6.2

Figure 3.6.3

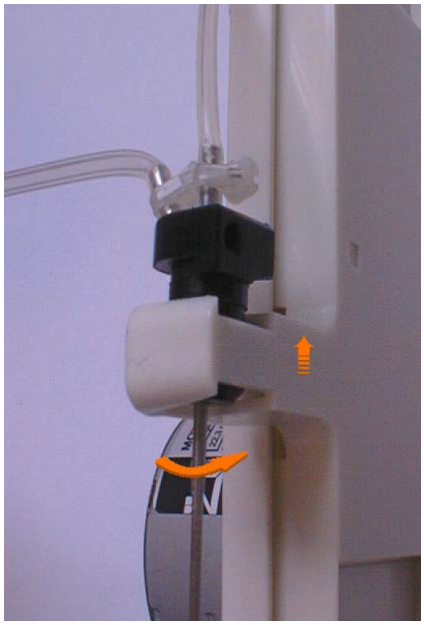


Figure 3.6.4

Figure 3.6.5

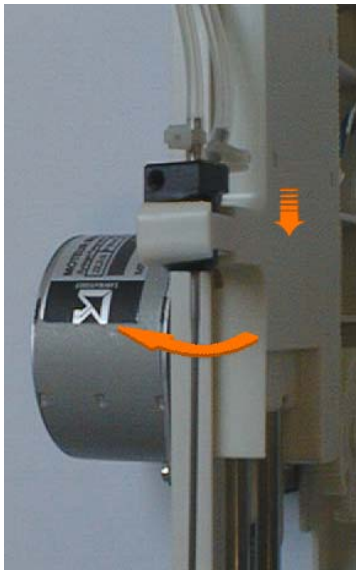
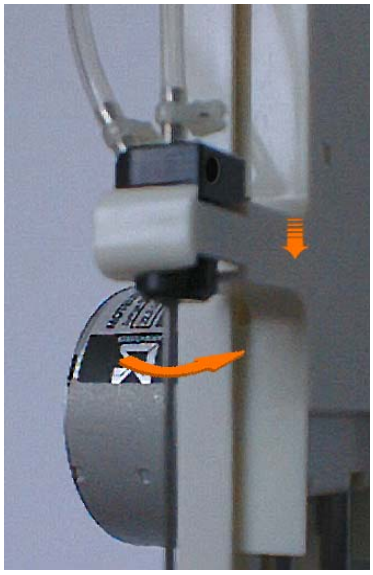


Figure 3.6.6



3.7 NEEDLE MAINTENANCE (1)

Notes:

The sampling needle is detailed as follows:

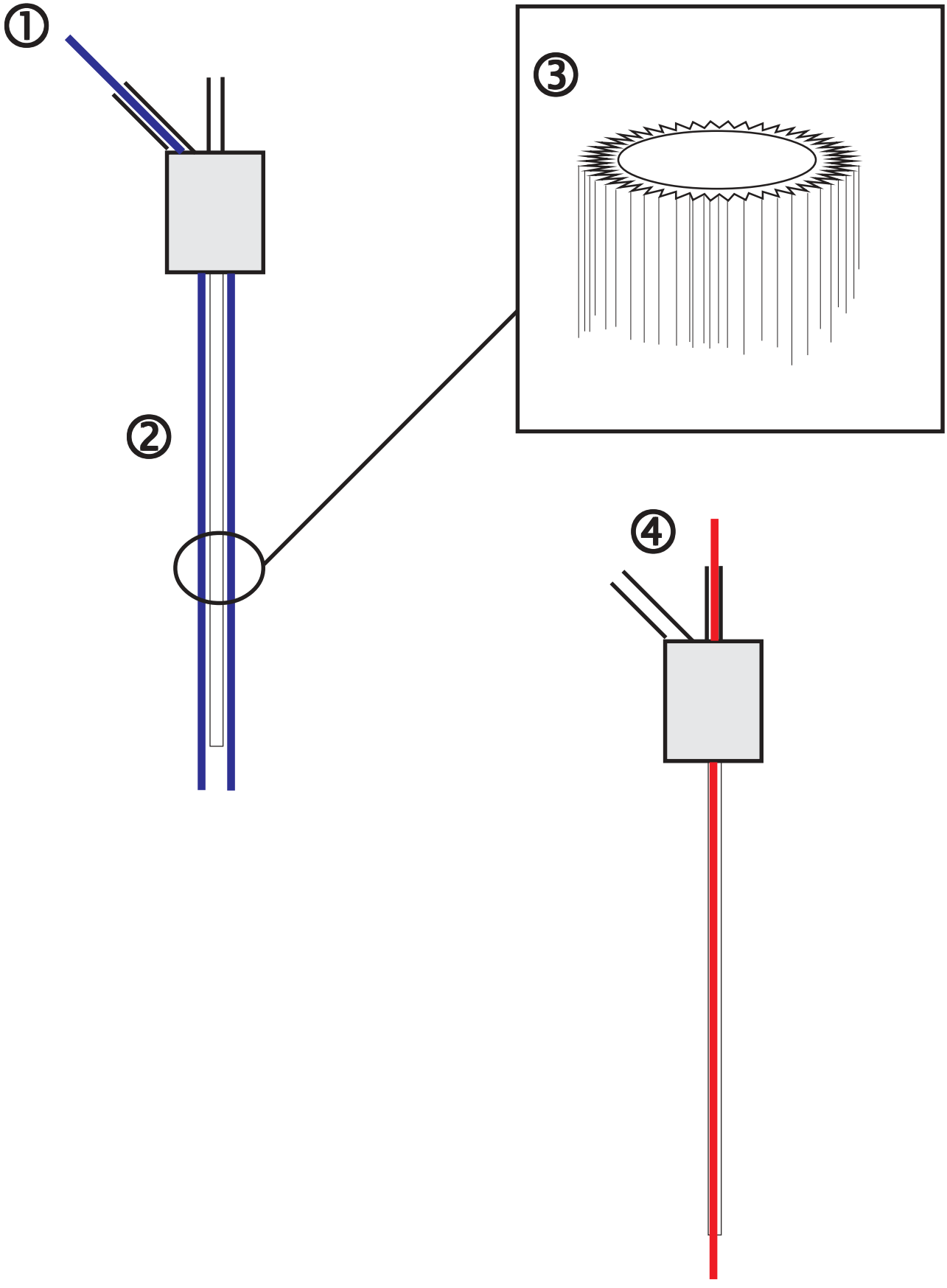
① The tilted steel tube to which a silicone tube is connected washes needle externally and allows the dilution to be first prepared with the Diluent.

② When the tilting steel tube is used, the Diluent exits the needle and flows around the outside. The Diluent is guided by the scored surface ③ of the needle.

④ The internal part of the needle is linked to the vertical tube which enables the blood to be aspirated and flushed back to the different dilution chambers for dilution. The thin internal part of the needle also permits a better mixing of the dilution.

MS-LAB reference:
Sampling Needle for MS4:3MS04 932

Figure 3.7.1



NEEDLE MAINTENANCE (2)

Notes:

The 'whole blood' sampling needle needs cleaning when the external washing of the needle is not perfect. This happens when the external flow of Diluent does not fall correctly outside the needle and when drops of blood or Diluent are splashed around the needle. The following steps must be taken:

Figure 3.7.2: Use the thinnest possible abrasive paper.

Figure 3.7.3: Polish the needle using **downward** vertical strokes **only** as shown. Do not use rotating or upward strokes which could destroy the vertical scored surface of the needle.

Figure 3.7.4: Then clean the needle properly with a soft cloth and a little alcohol (methylated spirits).

Figure 3.7.2

Figure 3.7.3

Figure 3.7.4

3.8 CARRIER BLOCK (1)

Notes:

Figure 3.8.1: To begin unlocking the Carrier Block:
- ① ② Pull out the 2 screws underneath the device.

Figure 3.8.2:
- ③ Remove the fixing screw of the dilutor. This one can be placed on one's side of the carrier block.
To finishing unlocking the Carrier Block:
- ④ ⑤ Pull out the 2 screws in front of the device. Notice that the 4 dilutor block screws are Self-Tapping Pan Head Screws.

Figure 3.8.3: Extract the Carrier Block:
- Gently pull the Carrier Block out as shown by the arrow in Figure 3.8.3 (shift it from left to right). The electrical connector, located at the bottom will be disconnected.

Note for reassembly:
When remounting, the Carrier Block must be inserted gently into the connector. DO NOT FORCE.
In case of difficulty to plug the block into the 9 pin connector, the two screws located underneath the instrument (location ⑥ in figure 3.8.1) can be loose. When the block is in place, do not forget to tighten these screws.

Figure 3.8.4: Top view of the Carrier Block
- ⑦ ⑧ Locate the 2 switches which control the carrier movement under the protective sheet.

MS-LAB reference:
Plastic Carrier + Dilutor Block:
3MS04 917B
Carrier Stepper Motor: 3MS04 410
Plastic Dilutor: 3MS04 915

Figure 3.8.1

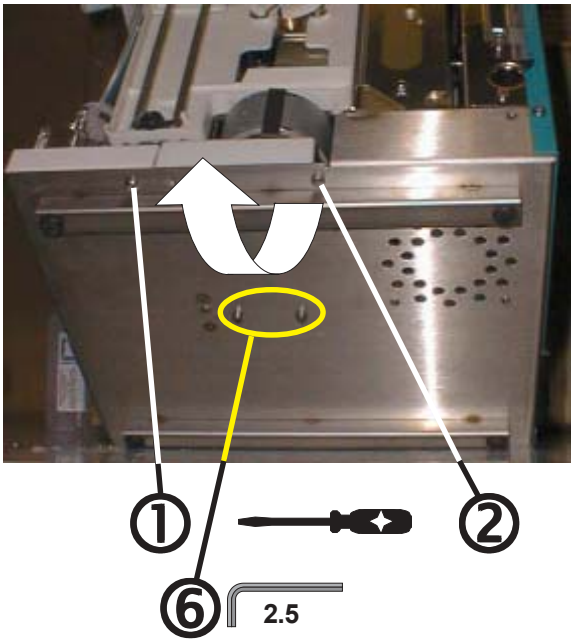


Figure 3.8.2

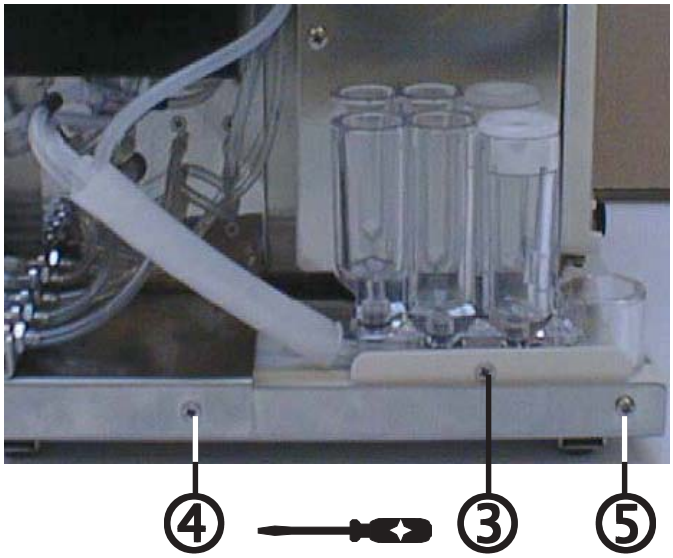


Figure 3.8.3

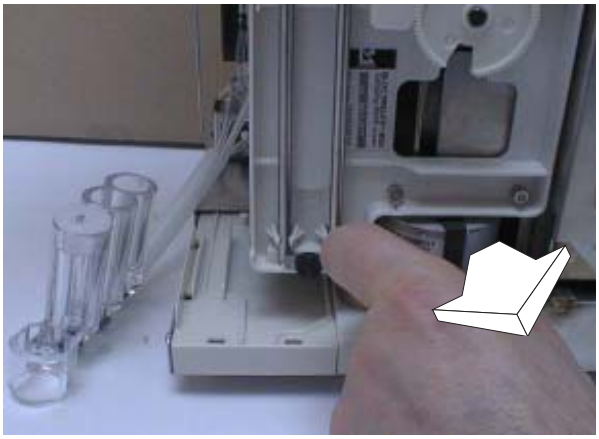
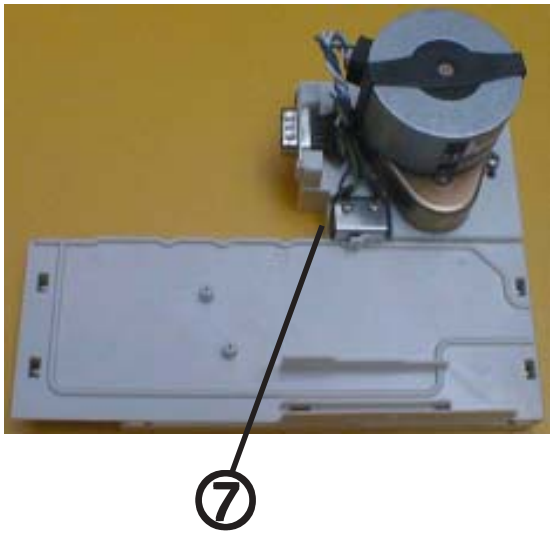


Figure 3.8.4



CARRIER BLOCK (2)

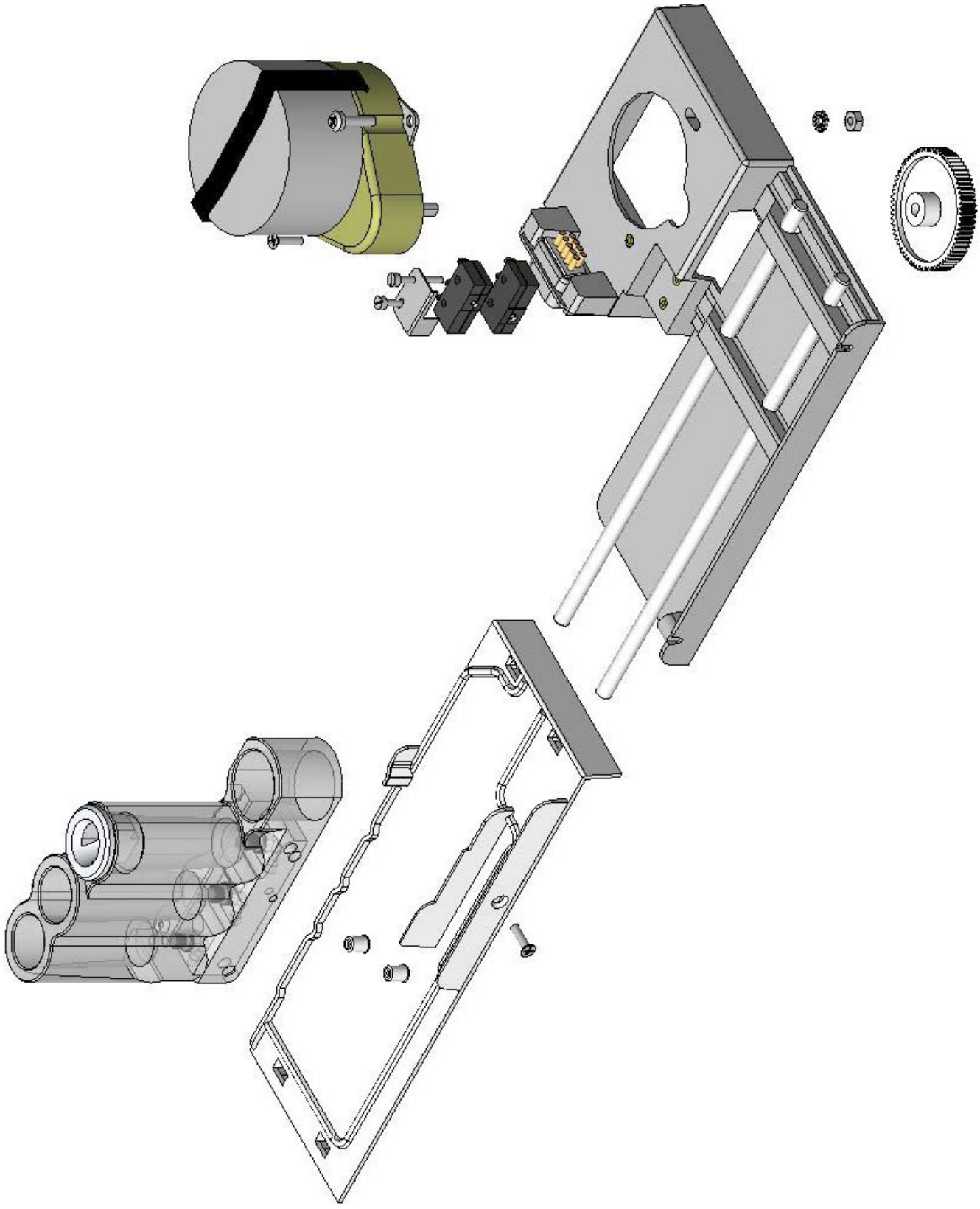
Notes:

Figure 3.8.5: Exploded view

Note 1: Reassembling switches
Verify the wires:
The lower switch is connected at a white/green wire and the actuator is on the left. This switch must be in the maximum right position.
The upper switch is connected at a green wire and the actuator is on the right. This switch must be set to the maximum front position.

Note 2: Install the moving part
To reassemble the upper moving part, engage the 2 axes on the right side of the carriage. Make sure that the 2 axes are in the extreme right position before snapping them into the upper part to avoid breakage of the switches actuators.

Figure 3.8.5



3.9 MEASURING CHAMBER (1)

Notes:

Preliminary:
To access the measuring chamber, it is necessary to take the metallic cover off by removing its 2 wing nuts.

Figure 3.9.1: Unplug the electrical connectors:
① Photometer emitter connector.
② Photometer receptor connector.
③ Probe connector.

Figure 3.9.2: Unplug reagent tubes:
- ① to ⑤ Remove the tubes from the fittings.

If in doubt when re-plugging, refer to the schematic map at the end of this manual.

- ⑥ ⑦ Remove the 2 Nylon nuts.

Figure 3.9.3: Take the measuring chamber out:
- Pull out the measuring chamber gently.

MS-LAB reference:
Complete Measuring Chamber with Photometer: 3MS04 910

Figure 3.9.1

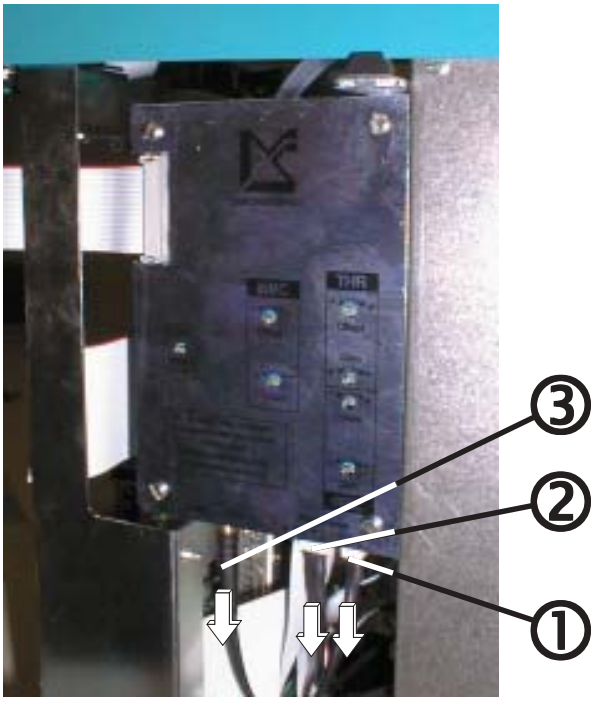


Figure 3.9.2

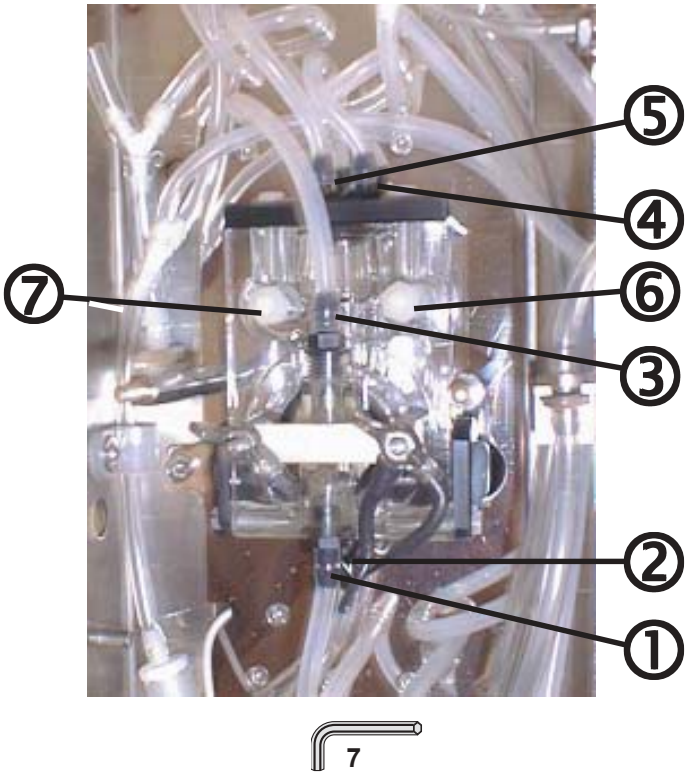


Figure 3.9.3

MEASURING CHAMBER (2)

Notes:

Figure 3.9.4: Photometer
The Photometer is in two parts:
- ① The Photometer Emitter part, visible in the picture, and ② the Photometer Receptor part at the opposite side of the measuring chamber.
- Remove the Nylon screws and pull each part out of the photometer.

Figure 3.9.5: Measuring Probe:
- Remove the ground wire from the lateral chamber by unscrewing the wing nut.
- ③ Unscrew (counterclockwise) manually the entire Probe.

Figure 3.9.6: Reassembling the Probe:
- Before reinserting the measuring chamber into its place, do not forget to put the ground wire into the slot at the backside of the chamber.

MS-LAB reference:
Probe for MS4: 3MS04 313
Photometer for MS4: 3MS04 316

Figure 3.9.4

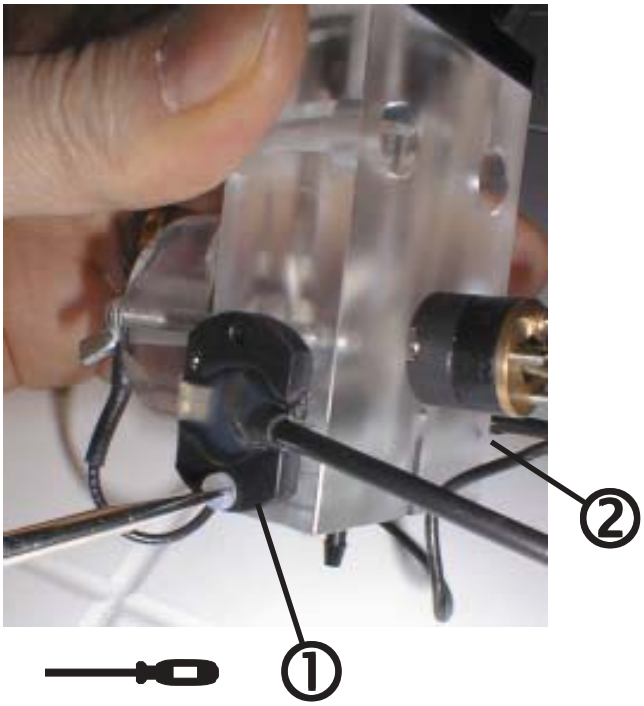


Figure 3.9.5

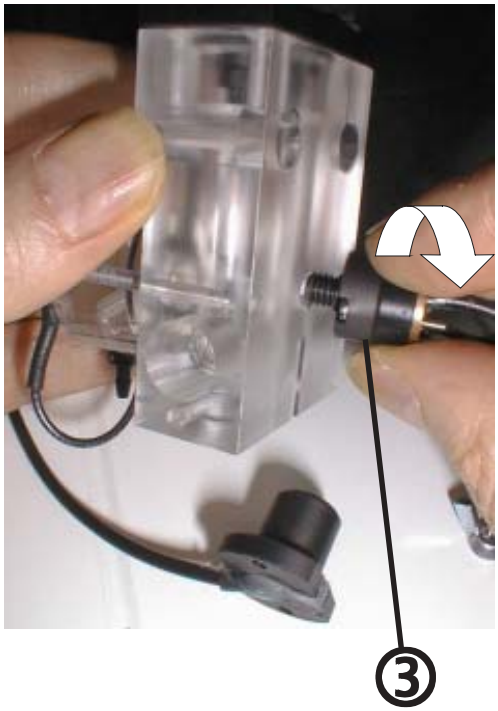


Figure 3.9.6

3.10 APERTURE

Notes:

Figure 3.10.1: Aperture access:
- Remove the 2 crystal tubes from the fittings of the lateral chamber.
- Unscrew the 2 wing nuts in front of the lateral chamber and remove the 2 wires.
- Remove the ground barrette.
- Pull the lateral chamber out.

Figure 3.10.2: View of Aperture and lateral chamber parts

Note: To dismantle the Aperture more easily:
- It is sometimes possible to access the Aperture without unplugging the crystal tubes. Just pull the lateral chamber out and catch the Aperture between the main chamber and the lateral chamber.

MS-LAB reference:
Aperture complete: 3MS09 325
Lateral chamber: 3MS04 317

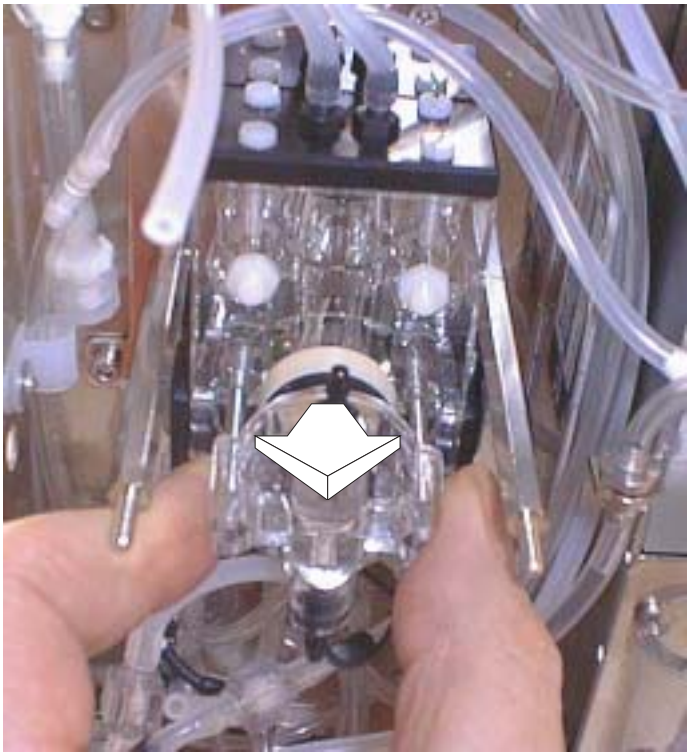


Figure 3.10.1

Figure 3.10.2

3.11 MEASURING BLOCK (1)

Notes:

Figure 3.11.1: Unplug the valves connector:
- ① Unlock the flat cable connector from the mother board and pull it out.

Figure 3.11.2: Unplug the silicone tubes:
- ① Remove the tube from the fitting of the expansion chamber.
- ② Remove the tube from the valve of the measuring block.

Figure 3.11.3: Unplug the crystal tubes:
- ① to ④ Unplug the 4 tubes from the Pump block

Figure 3.11.4: Removing the Fluidic Connector:
- ① ② Unscrew the 2 Hexagon socket head cap screws one turn, move the fluidic connector to the right and lift it. Keep the crystal tubes connected to the Metallic Fluidic Block.

MS-LAB reference:
Fluidic connector: 3MS04 935
Expansion chamber: 3MS04 925

Figure 3.11.1

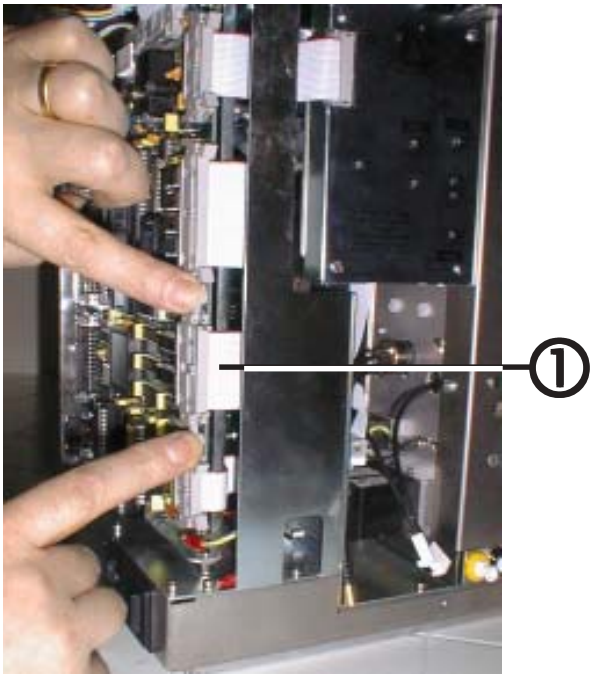


Figure 3.11.2

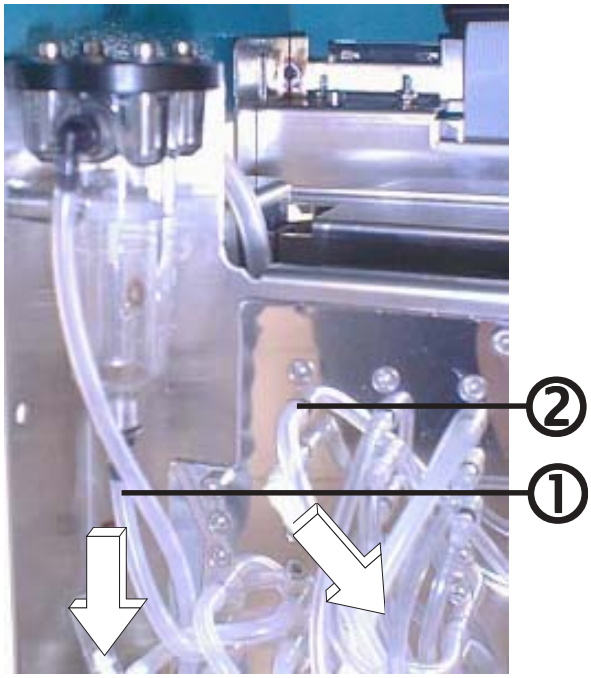


Figure 3.11.3

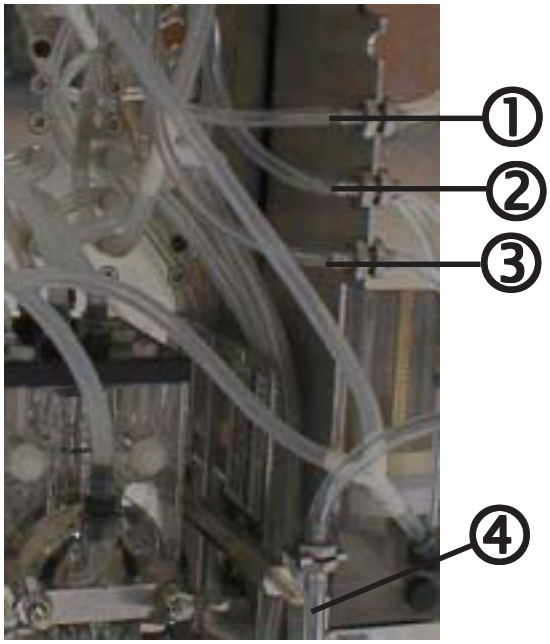
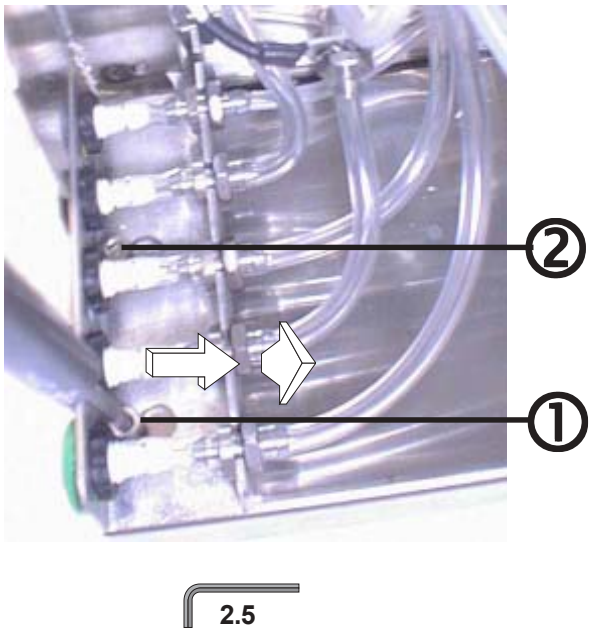


Figure 3.11.4



MEASURING BLOCK (2)

Notes:

Figure 3.11.5: Unplug the valves power connector:
- ① Pull out the connector accessible from the left side of the instrument, as shown by arrow.

Figure 3.11.6: Take the Measuring Block off:
- Remove the 4 Hexagon socket head cap screws in front of the Block and pull the entire block out from the instrument.

Figure 3.11.7: Take a valve apart:
- Remove the connector board behind the valves.
Use a flat blade screwdriver as a lever to disconnect it as shown in the picture, the tip of the screwdriver must always stay on the valve, never on the printed circuit board.

Figure3.11. 8: Removing the valve:
- Remove the 2 screws located on each side of the valve and extract it for replacement. (Tubes must be unplugged before).

MS-LAB reference:
Solenoid Valve 2-Way: 3MS09 450
Solenoid Valve 3-Way: 3MS09 451

Figure 3.11.5

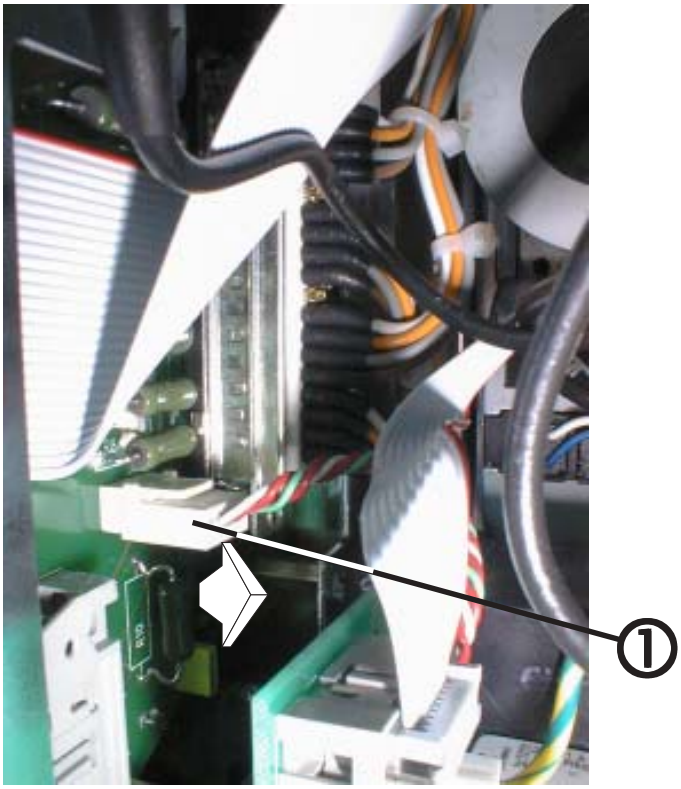


Figure 3.11.6

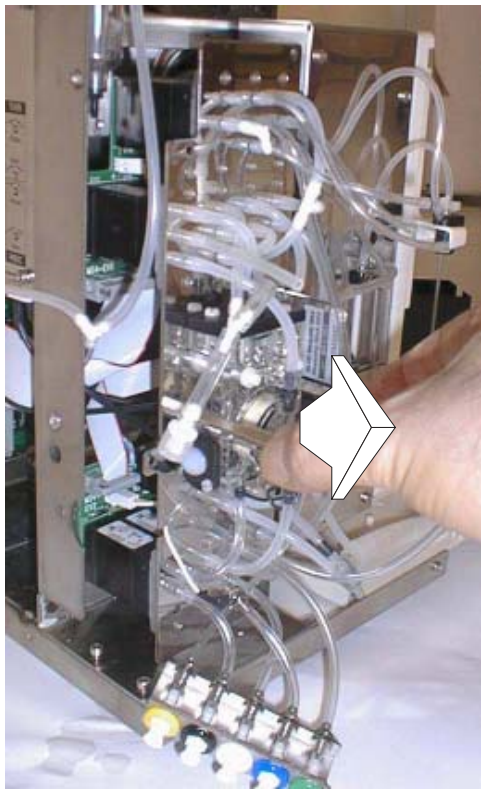


Figure 3.11.7

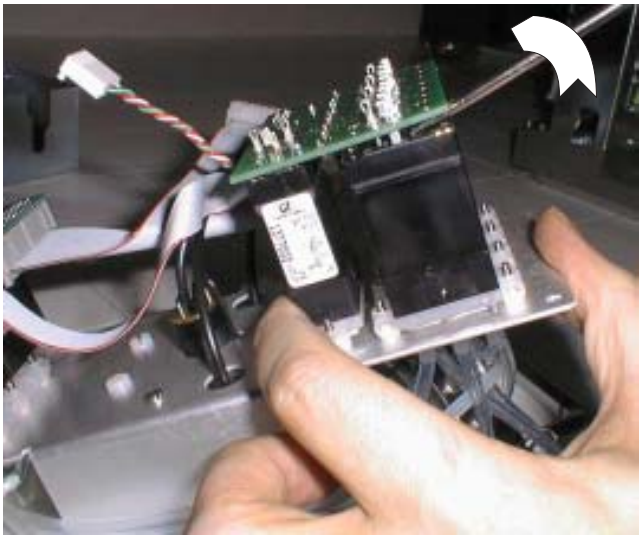
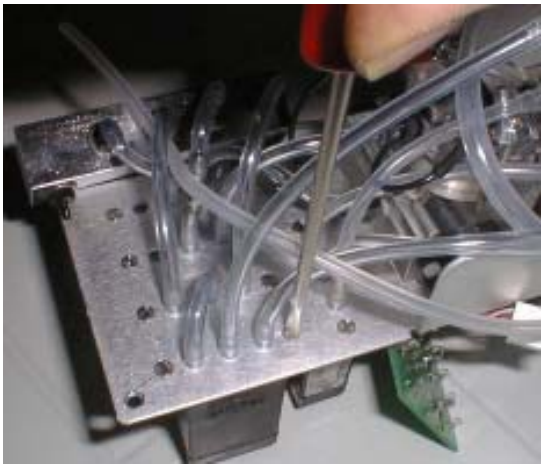
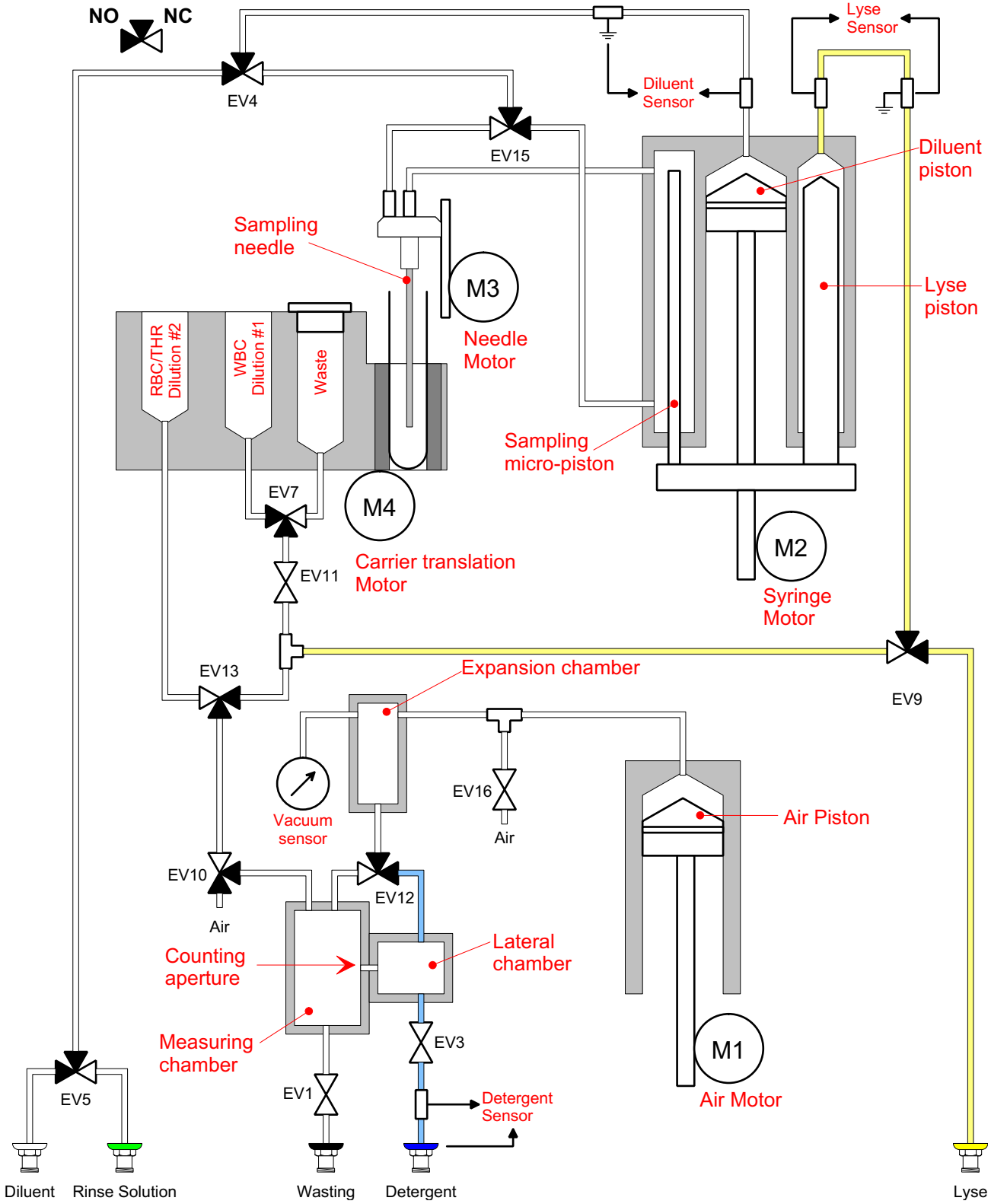


Figure 3.11.8

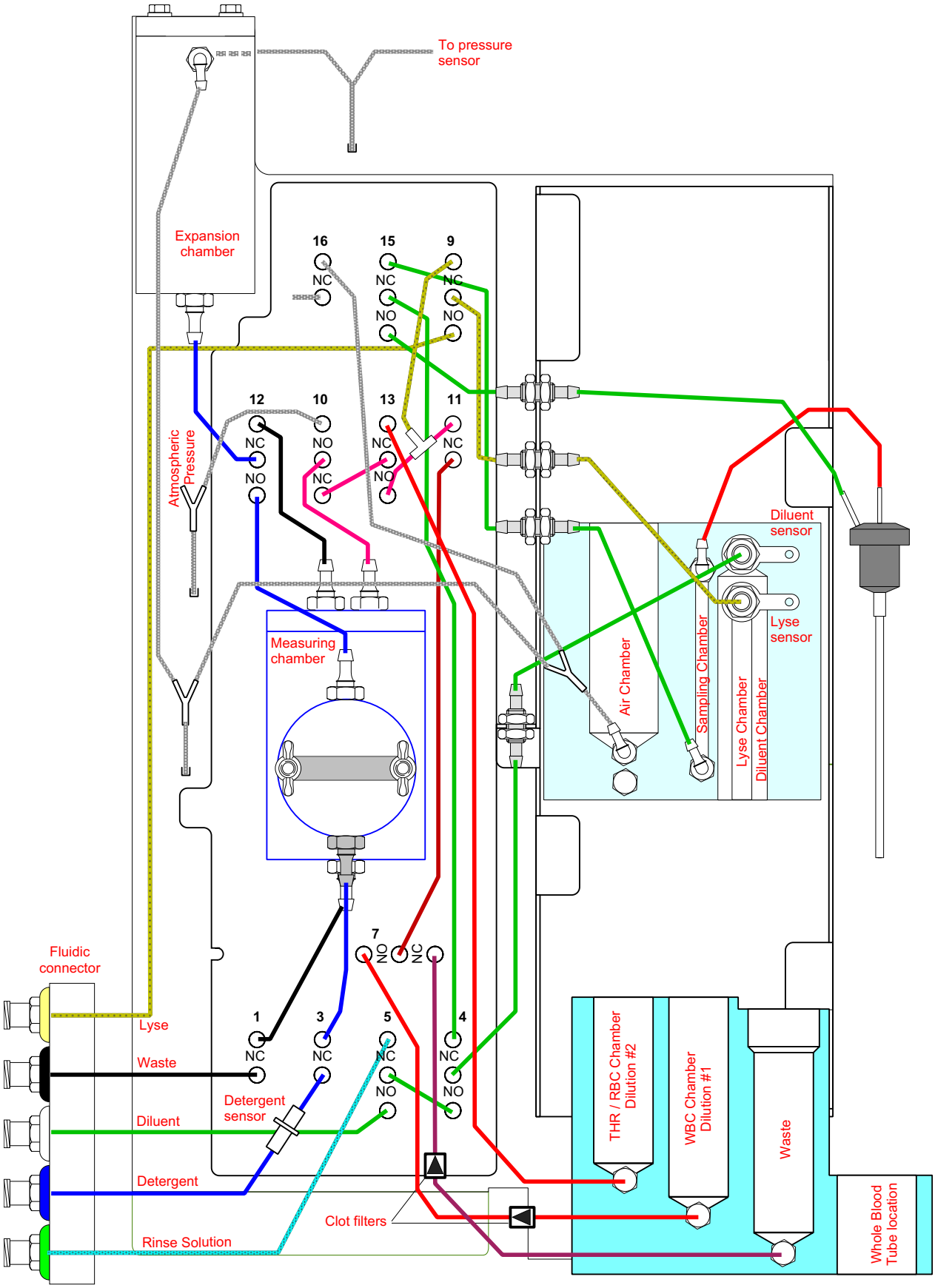


4: SCHEMATIC DIAGRAMS

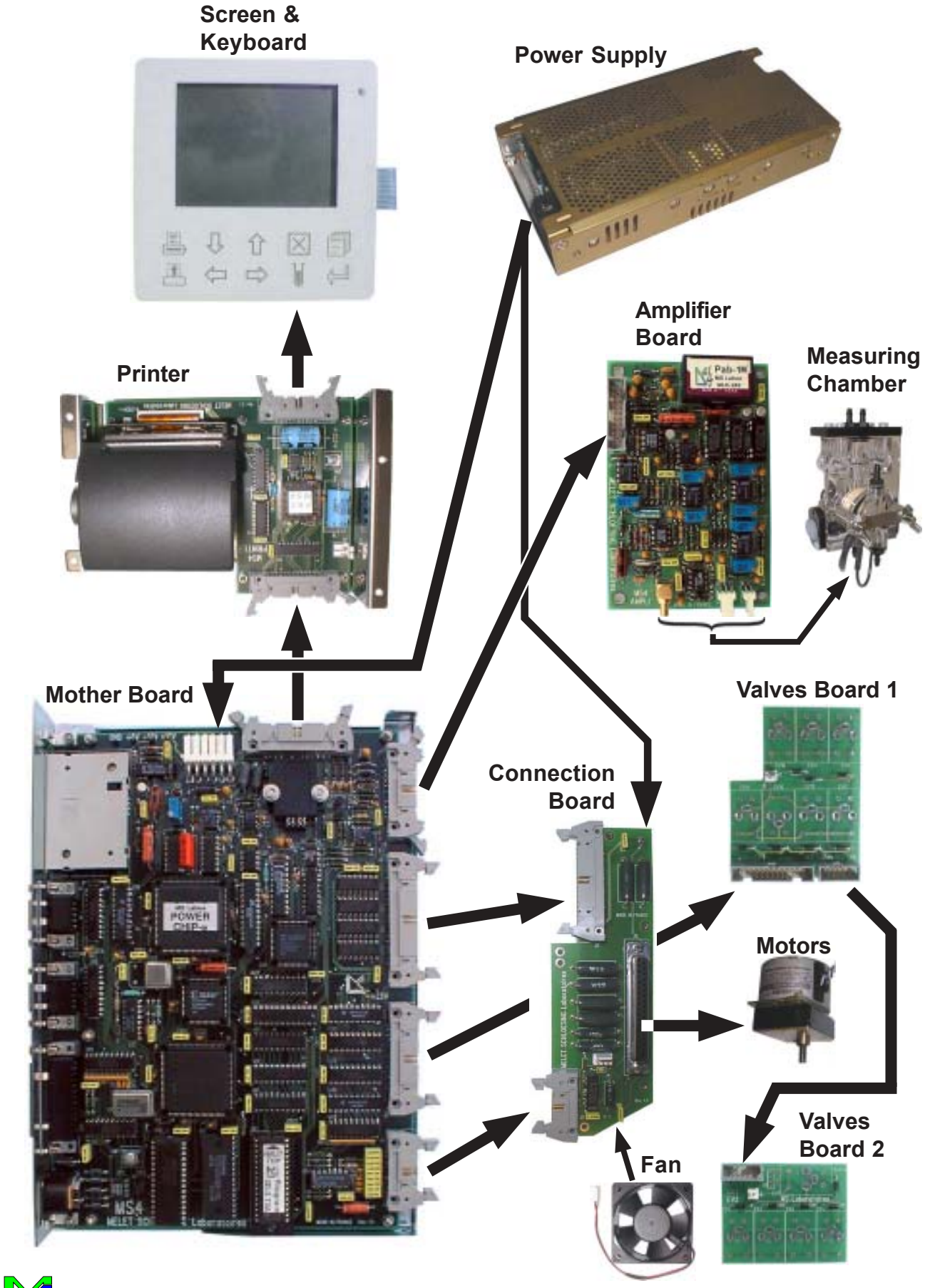
4.1 PRINCIPLE CIRCUIT



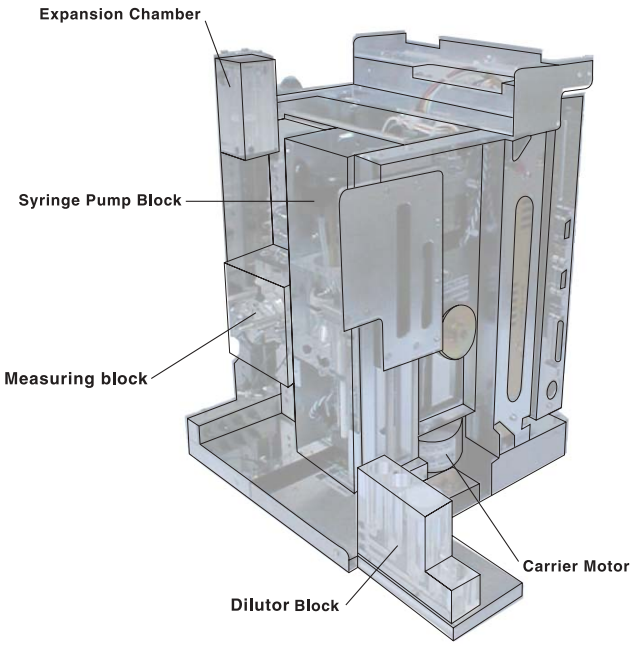
4.2 COMPLETE FLUIDIC CONNECTIONS

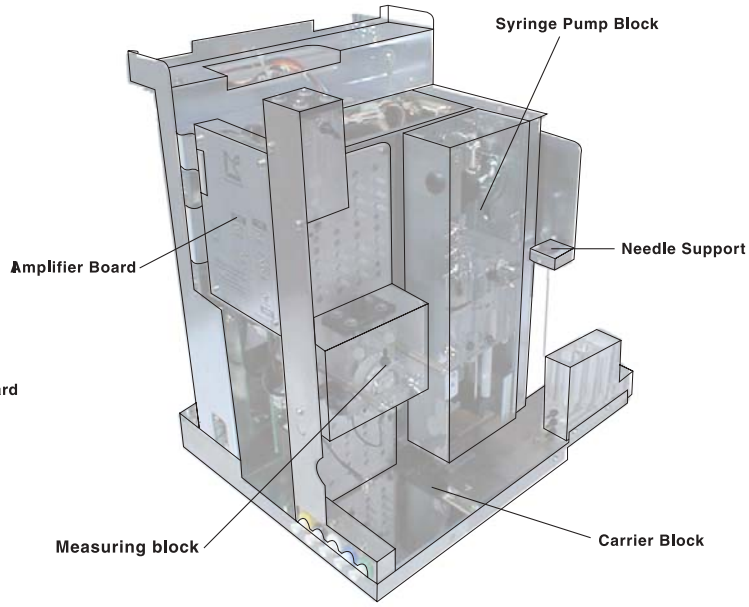


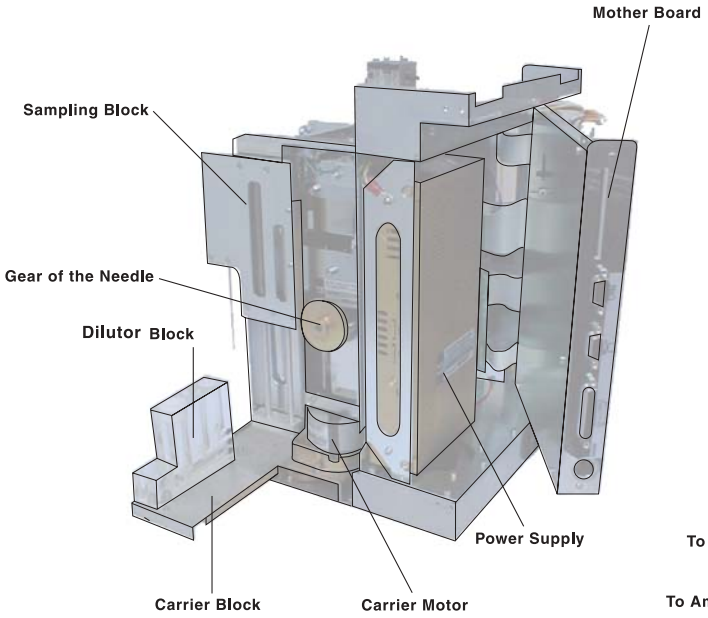
4.3 GENERAL ELECTRONIC DIAGRAM

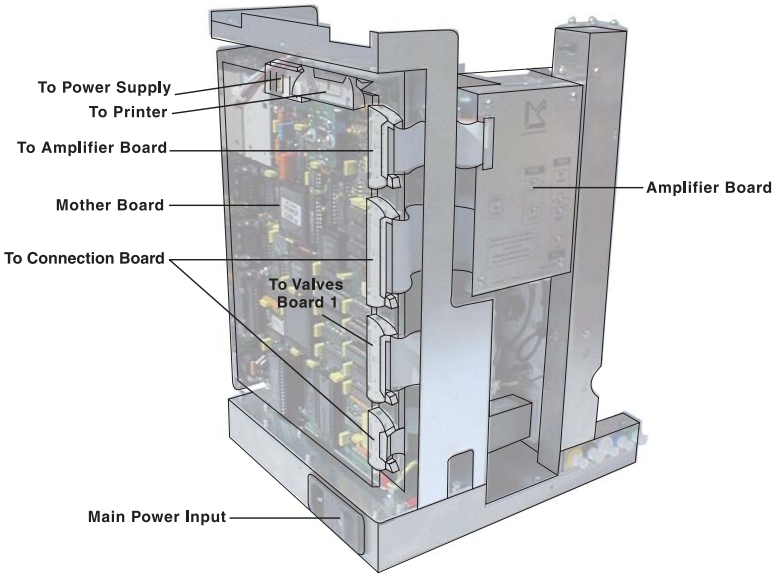


4.4 MS4® MAIN PARTS









5: REFERENCE SPARE PARTS

5.1 COMPLETE PARTS

3MS04 964
FRONT COVER + DISPLAY

3MS04 941
PRINTER BLOCK

3MS04 935
FLUIDIC CONNECTOR

3MS04 930B
PLASTIC SAMPLING BLOCK

3MS04 917B
PLASTIC CARRIER + DILUTOR BLOCK

3MS04 920
SYRINGE PUMP BLOCK

3MS04 910
MEASURING CHAMBER WITH PHOTOMETER

3MS04 925
EXPANSION CHAMBER

5.2 SOLENOID PARTS

3MS04 410
CARRIER STEPPER MOTOR

3MS04 409N
SAMPLING BLOCK MOTOR

3MS04 409S
SYRINGE PUMP MOTOR

3MS04 409A
AIR PUMP MOTOR

3MS04 652
FAN

3MS09 450
SOLENOID VALVE 2-Way

3MS09 451
SOLENOID VALVE 3-Way

5.3 PLASTIC PARTS

3MS04 915
PLASTIC DILUTOR

3MS04 902
ADAPTOR TUBE KIT

3MS04 313
MEASURING PROBE

3MS04 316
PHOTOMETER

3MS04 317
LATERAL CHAMBER

3MS09 315C
APERTURE COMPLETE

3MS04 932
SAMPLING NEEDLE
FOR PLASTIC SAMPLING BLOCK

5.4 ELECTRONIC PARTS

3MS04 233
POWER SUPPLY

3MS04 942
MOTHER BOARD BLOCK

3MS04 215
CONNECTION BOARD

3MS04 241
AMPLIFIER BOARD

3MS04 945
DISPLAY BOARD +
KEYBOARD BLOCK

5.5 ACCESSORIES

3MS09 970
FRENCH EXTERNAL ALPHANUMERIC KEYBOARD

3MS09 971
US EXTERNAL ALPHANUMERIC KEYBOARD

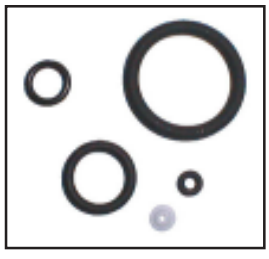
3MS09 972
CYRILLIC EXTERNAL ALPHANUMERIC KEYBOARD

3MS04 901
TUBE KIT FOR PACK

3MSR 0430
PRINTER ROLL PAPER

3MS09 560A
BLOOD CLOT FILTER

3MS09 890
SPECIAL GREASE FOR SYRINGE AND O-RING



3MS04 905
SYRINGE SET OF O-RING

NOTES